INTEGRATED CLINICAL,FNA CYTOLOGICAL, MAMMOGRAPHICAL AND ULTRASONOGRAPHICAL APPROACH IN THE DIAGNOSIS OF BREAST MASS LESIONS

dissertation submitted for

BRANCH - I M.S (GENERAL SURGERY)
APRIL 2013

The Tamilnadu
Dr.M.G.R., Medical university
Chennai.

DEPARTMENT OF GENERAL SURGERY,
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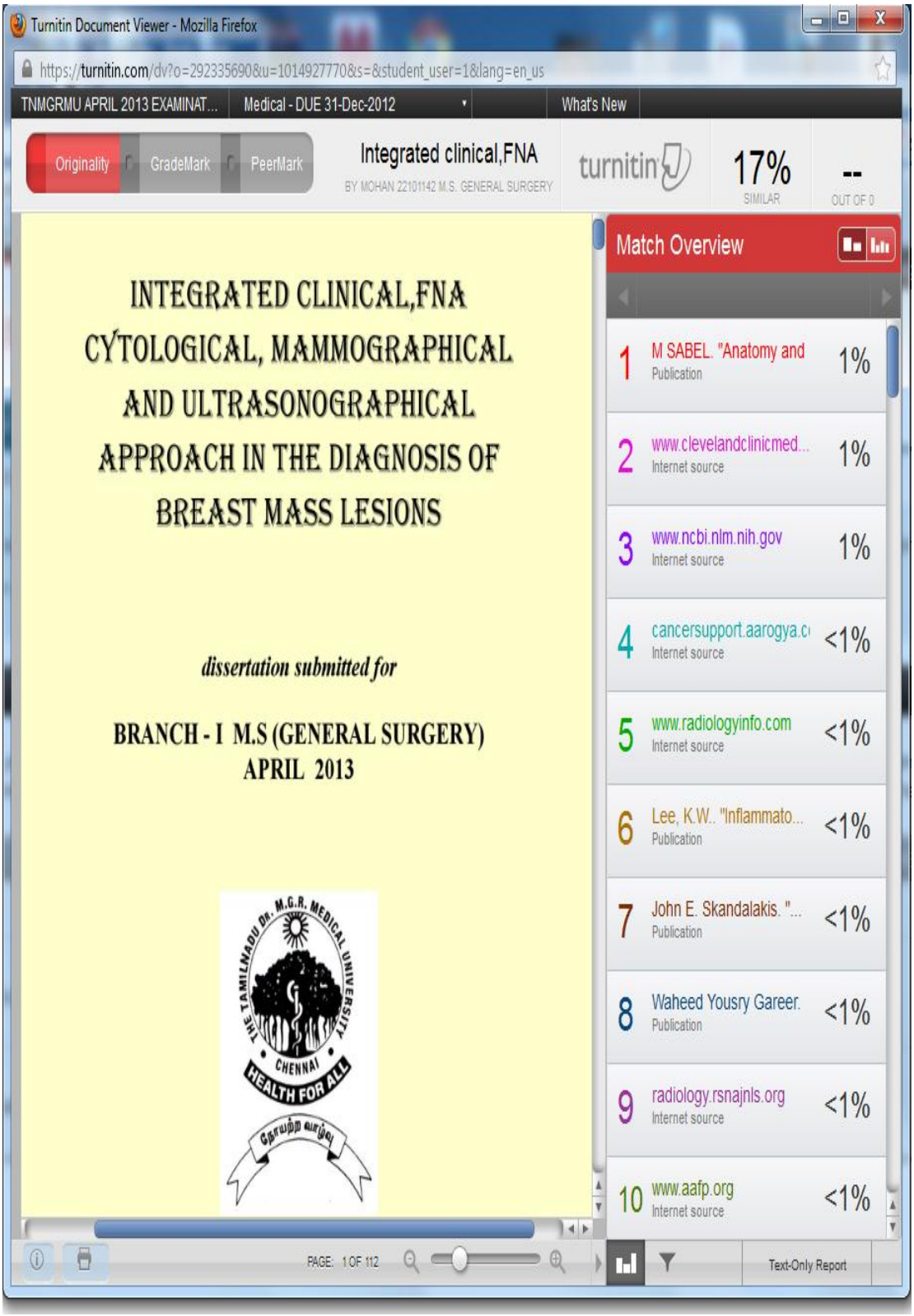
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INTEGRATED CLINICAL,FNA CYTOLOGICAL, MAMMOGRAPHICAL AND ULTRASONOGRAPHICAL APPROACH IN THE DIAGNOSIS OF BREAST MASS LESIONS dissertation submitted for BRANCH - I M.S (GENERAL SURGERY) APRIL 2013 THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY CHENNAI CERTIFICATE This is to certify that the dissertation entitled “Integrated Clinical, FNA Cytological, Mammographical and Ultrasonographical approach in the diagnosis of Breast Mass Lesions” is the bonafide work of Dr.P.MOHAN in partial fulfilment of the university regulations of the Tamilnadu Dr. M.G.R. Medical University, Chennai, for M.S. (Branch I) General Surgery examination to be held in April 2013. Prof.Dr.M. Nasheer Ahamed Syed M.S., Professor...

CERTIFICATE

This is to certify that the dissertation entitled "**Integrated Clinical, FNA Cytological, Mammographical and Ultrasonographical approach in the diagnosis of Breast Mass Lesions**" is the bonafide work of **Dr.P.MOHAN** in partial fulfilment of the university regulations of the Tamilnadu Dr. M.G.R. Medical University, Chennai, for M.S. (Branch I) General Surgery examination to be held in April 2013.

Prof.Dr.M. Nasheer Ahamed Syed M.S.,
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DECLARATION

I , **Dr.P.MOHAN**, hereby declare that, I carried out this work on **"Integrated clinical, FNA Cytological, Mammographical and Ultrasonographical approach in the diagnosis of Breast Mass Lesions"** at the Department of Surgery, Government Rajaji Hospital, Madurai, under the guidance of **Prof.Dr.M.Nasheer Ahamed Syed, M.S.,** Professor of Surgery, during the period of August 2010 to September 2012. I also declare that this bonafide work has not been submitted in part or full by me or any others for any award , degree or diploma to any other University or Board either in India or Abroad.

This is submitted to the Tamilnadu Dr.M.G.R.Medical University, Chennai in partial fulfilment of the rules and regulations for the M.S. Degree Examination in General Surgery (Branch I) to be held in April 2013 .

(Dr.P.Mohan)

Place : Madurai

Date :

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CONTENTS

Introduction

From the very ancient period carcinoma breast has been one of the most common ailments affecting human civilization. It is the most common carcinoma causing death in females in western world whereas it is second most common cause next to carcinoma cervix in developing world like India[1]. Though carcinoma breast seems easier to diagnose and treat but till today it is a challenge for medical professionals to restrain this malignant disease.

The clinical examination, imaging and Fine needle aspiration biopsy collectively included in "Triple assessment technique". Both sensitivity and specificity of this is 99%. If any of these three modalities suggest cancer, excisional biopsy is warranted.

CLINICAL EXAMINATION

A proper history and a thorough physical examination is the oldest and yet the most useful and indispensable method of diagnosis as said by **Haagensen CD**[3].

A clinician who gives importance to the results of newer diagnostic methods than physical examination of the breast is bound to make errors. Physical examination remains the gold standard and should unequivocally be employed as the first line method for diagnosing breast lumps.

FNAC

Several irreproachable advantages of FNA cytology in assessment of breast lumps, have made it the first line modality in the investigative sequence. Some of these advantages are[4] : excellent patient compliance, short time required for planning of surgery and ancillary staging investigations without delay, avoidance of surgery in unequivocally benign conditions, equitable use of hospital and operation theatre facilities with reduction in the need of frozen section, excisional or core needle biopsies.

MAMMOGRAPHY

Roentgenography to identify breast diseases was first used in 1913 at the University of Berlin. Since then, mammography has been widely accepted as a routine examination in the evaluation of breast diseases.

Mammography, is most widely used methods for detecting early breast cancer.

Mammography is a special type of x-ray, used to create detailed images of the breast. Mammography uses low dose x- ray : high contrast - high resolution film; and an x-ray system designed specifically for imaging the breasts..

Mammography can identify lesions in impalpable brest lump.

ULTRASONOGRAPHY

Ultrasound is particularly useful in young women with dense breast in whom mammograms are difficult to interpret, and in distinguishing cysts from solid lesions. It can also be used to localize impalpable breast lumps.

Ultrasound can be used to evaluate abnormalities in breast seen in mammography. Both undetected and detected breast mass by other modalities can go for ultrasound guided biopsy.

Aims of Study

1. To evaluate the various diagnostic modalities in breast mass lesion e.g. FNAC, USG, Mammography and Clinical assessment.
2. Utility and importance of integrated clinical, FNA Cytological, mammographical and Ultrasonographical approach in the diagnosis and work up of patients with breast mass lesion.

HISTORICAL REVIEW

The earliest medical record available about the tumors and ulcers of the breast is Edwin Smith Surgical papyrus [1822-1906], which mentions about eight of such cases, this record was written in Egyptian pyramid age in old kingdom (3000-2500 BC). This record explains cauterization by fine drill technique as practiced by "Imhotap" the oldest known physician.

Another old Egyptian Manuscript "Ebers Papyrus" (1600-1500 BC) explains the treatment of breast tumor by cautery and then by knife with coarctation of skin edge of the wound.

Another important record of "Herodotus", a tumor historian, who records the successful treatment of advanced and ulcerated tumors of the breast. Attossa, daughter of Cyrus concealed a tumor in her breast for a long time till it grew big and ulcerated. When she was sent to Demoncedus a famous physician, who is said to have cured her breast tumor. This case may be probably be a benign tumor of the breast such as cystosarcoma phyllode, said to be cured. The method of treatment was not revealed. 'Hippocratus' (5th century BC) who is known as father of Medicine, in his work "Disease of Women" describes the origin of the

hard tumor of the breast and value of medical, Surgical and Cautery treatment in the breast tumors and whether any of the treatment is of real benefit or harmful. He says that a knife can cure the tumor which is incurable by medicine, and cautery can cure the tumor which is incurable by surgery.

And if all the three cannot cure the tumor then the disease is incurable. He knew that a few tumors, in their early stages have got more chances of cure than those which are in advanced stage

'Galen', the great scholar of Greece (2nd century AD) the founder of "Humeral theory of disease" recommended surgery for the tumor of the breast which were removable. These tumors were, as we asses today may be benign or malignant tumors is early stages. He was the one who vividly described the cancer of the breast resembling the "Crab" which even today forms the symbol of cancer. 'Leonides', a great physician of Alexandraian School used the sign of the retraction of the nipple to differentiate the malignant tumors from the benign tumors. After nearly a thousand years (14th century A.D) 'Len frank', father of French Surgery was using leonide's method of treatment for breast tumors.(surgical). 'Leonard Fushs' (1501-1546) and Guy-De-chouliac (1300-1367) were the other workers who favored the surgery for tumors of the breast with other medical treatment. 'Mercus Aurelins severimens' (1580-1656) school of Severino recommended excision of benign tumors of the breast in fear

that the possibility of them becoming malignant. 'Scultetus' (1595 – 1645) a famous illustrator of surgery, devised the quick methods of surgery for breast as anaesthesia was undeveloped at that time, quickness was the criteria in surgery. 'Jean Louis Petit' (1674 – 1750) Alexander Manro (1773 – 1850), Avela pean

(1795 – 1867) Sir James Paget (1814 – 1899) and Muller (19th century) were the other workers who have contributed much to the knowledge of tumors of the breast and their management. 'Virchow' (1821 – 1902) differentiated benign and malignant tumors by their cellular structures, and stated that any benign tumor cell can become malignant if it is subjected to irritation. 'Samuel-W-Gross' was in belief and stated that benign tumors of the breast & non invasive carcinoma can be cured, if they are operated early. In 1905 Collins Warren brought a paper on benign tumor of the breast & their classification. That was the first paper entirely devoted on benign tumors of the breast. And also he advised only local excision is sufficient for these benign tumors. 'Hughes' and 'Mansel' (1982) have brought out a paper about Etiology and management of benign disease of the breast.

In present century workers like Cheatle. Cutler, Thackeray, Handly, Markwitz, baker, Harrington, miller, Stewart, Friedman, Tayler, Lettes-J-collins and still more scientist have contribution in understanding of aetiology nature & the treatment of benign tumors of breast.

ANATOMY

EMBRYOLOGY

During the 6th week of Intrauterine life of the human Embryo, a linear ectodermal thickening occurs along the line which is stretched from the axilla to the groin, on either side called “Milk ridges” or milk streak or “Galactic Band”.

Among the Milk Streak or Galactic band the portion in the region of the thorax forms the mammary primordium. The rest of the portion gets regressed. The mammary primordium undergoes a number of stages to form the mammary gland. They are

1.Milkhill stage

2.Disk stage

3.Globular stage

4.Budding stage

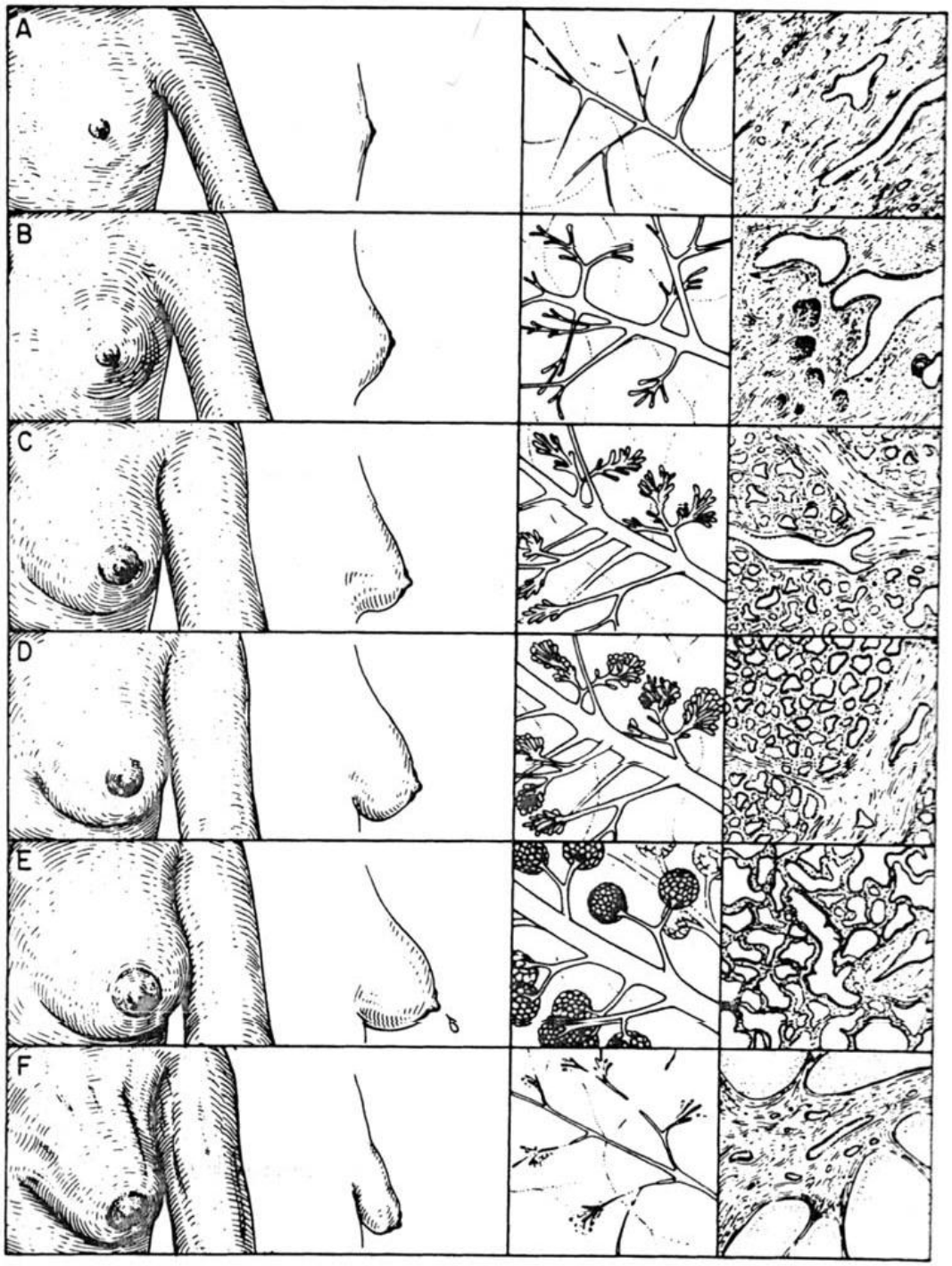
5.Branching stage

The secondary mammary changes then develop.The adult female breast is also a‘modified apocrine sweat gland’. Then

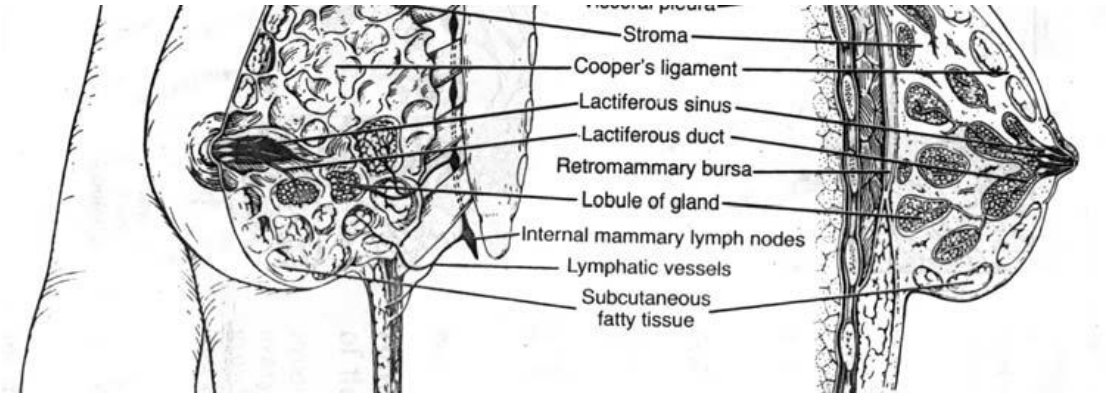
6.Canalization stage and

7.End vesicle stage

Pict.–1: Mammary gland development. *Anterior and lateral views of the breast are shown in columns 1 and 2. The microscopic appearance of the ducts and lobules are illustrated in column 3 and 4, respectively. Panals: A - Prepubertal (childhood), B – Puberty, C – Mature (reproductive), D – Pregnancy, E – Lactation, F – Post maenopausal (Senescent state)*



Pict. 2 : Anatomy and physiology of the normal and lactating breast



MORPHOLOGY OF NORMAL BREAST

[Gross Anatomy of Breast]

The breast is located within the superficial fascia of the anterior thoracic wall, the adult breast lies between the second and sixth ribs in the vertical plane, from lateral edge of the sternum to mid axillary line in horizontal plane. The deep portion or posterior surface rests on portions of deep investing fasciae of the pectoralis major, serratus anterior and external oblique and upper extent of rectus sheath. The average breast measures (base) 10 to 12cm in diameter and 5 to 7 cm thickness. A typical non lactating breast weighs between 150-225gms, the lactating breast exceeds 500gms. The shape or contour of the nulliparous female

breast has a typical hemispheric, with distinct flattening above the nipple. The multiparous women's breast, with hormonal stimulation associated with pregnancy and lactation is usually larger and pendulous. The contour is been explained by the orientation of the base of the breast and depends on the shape of the thorax. A portion of the breast tissue projects into axilla called as "Axillary tail of spence" The breast consists of 3 major structures.

a) skin,

b) Subcutaneous tissue

c) Breast tissue with parenchyma and stroma.

The breast parenchyma composed of 15-20 segments. Nearly 5-10 major collecting ducts open in to nipple . The branching system may be named in a logical fashion. Starting with ducts from the nipple to the ducts draining each alveolus, the nomenclature of breast Epithelial System is as follows.

Major Ducts :

- Collecting ducts
- Lactiferous sinuses
- Segmental ducts
- Sub-segmental ducts

Terminal Duct – Lobular unit :

- Terminal ducts
- Extra lobular
- Intra lobular
- Lobules

According to this collecting duct drains the segmental ducts, segmental ducts branch into a series of sub-segmental ducts in to which the terminal ducts drain. Each terminal duct supplies the single lobule forming terminal duct lobular unit [TDLU] of Wellings (1975).Many ductules arise from the terminal ducts. The extra lobular ducts are surrounded by elastic tissues and ordinary connective tissue. The lobules does not contain elastic tissue but it contains specialized loose vascular stromal tissue.

The larger ducts are sites of benign papilloma. TDLU are site for origin of fibroadenoma, in the development phase, cyst formation and sclerosing adenosis in involuntary phase. Intralobular portion of terminal duct are the site for carcinoma.

The breast skin like skin in other areas contains hair follicles,sweat glands and sebaceous glands.

The nipple is a conical eminence, surmounted on the areola at its centre. Its position corresponds to a point in the 4th intercostal space, a little lateral to mid clavicular line in virgin; And it is altered in 1st pregnancy. Nipple is directed outwards and upwards, which makes it convenient to feed the baby. It is devoid of fat, and contains fibrous tissue, strands of smooth muscle fibers, which causes erection of nipple on mechanical stimulation. Lactiferous duct opens into its centre.

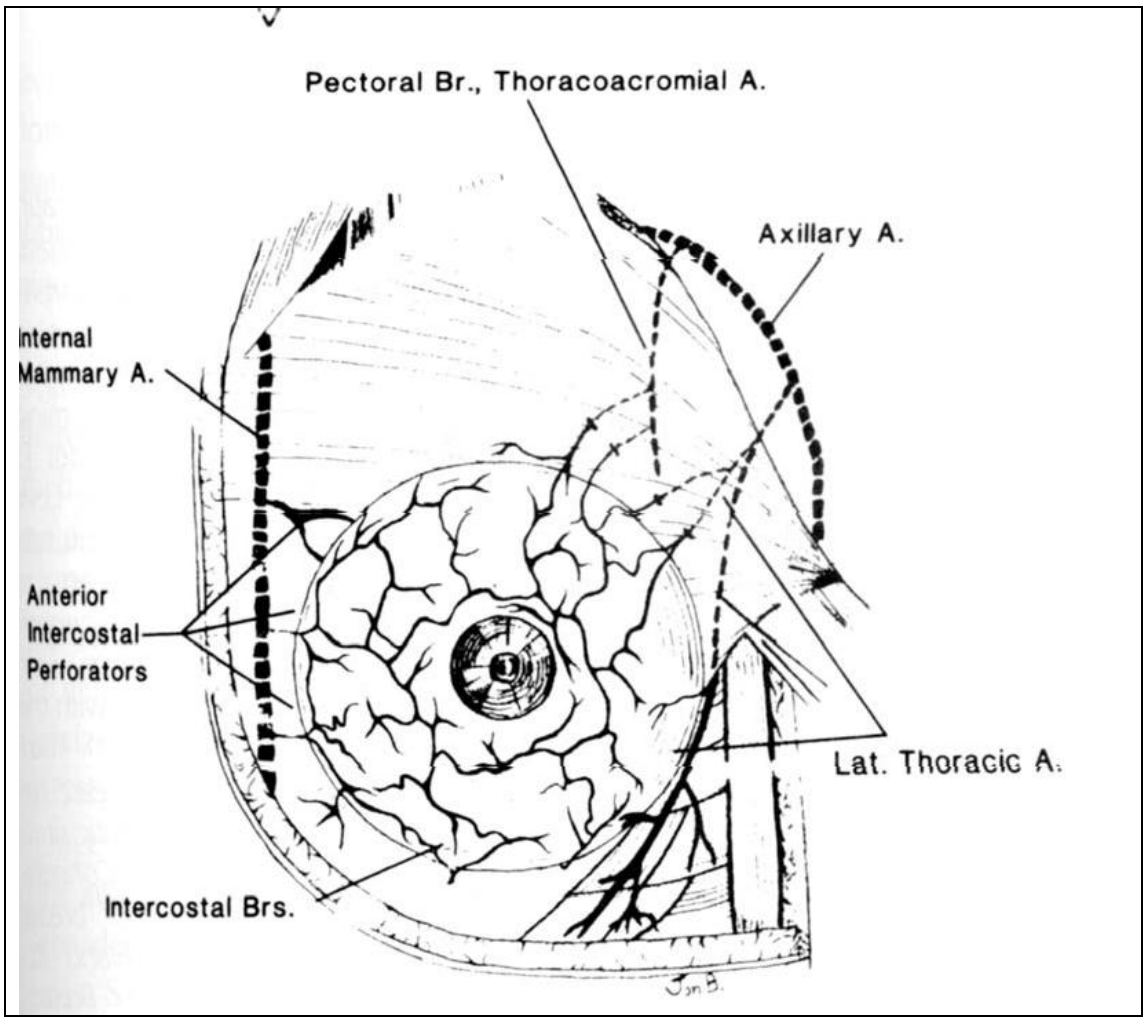
Areola is a pigmented area about 3cm in diameter around the nipple. It is hairless in females. It is rosy pink in virgins and becomes dark on first pregnancy during 2^{nd} month and remains so far the last of the life. In pregnancy it enlarges to about twice its normal size and this enlarged areola is known as the second areola.

Areola has sebaceous glands and they appear as tubercles and these are known as areolar glands or 'Montgomery glands'. [Tubercles of Montgomery]. These glands provide lubrication during suckling. The oily secretion of the sebaceous glands is a protective lubricant during lactation. Facial tissue envelope the breast. The breast is enveloped by superficial pectoral fascia and under surface is covered by deep pectoral fascia. Both parts are connected by fibrous band called as suspensory ligament of cooper which supports the breast.

Blood Supply of the Breast

The mammary gland is extremely vascular, the blood supply is derived mainly from the internal mammary and lateral thoracic arteries. Nearly 60% of the breast on its medial and central parts are supplied by the anterior perforating branches of the Internal mammary artery [Internal thoracic artery]

Pict.-3 :



About 30% of the breast is supplied by the lateral thoracic artery on its upper, outer quadrant. The pectoral branch of the thoraco acromial artery and superior thoracic artery, (branches of axillary artery), the lateral branches of the 3rd, 4th and 5th intercostals arteries, and also subscapular and thoracodorsal arteries, all they make minor contribution in the blood supply of the breast.

Venous drainage

The pattern of venous drainage is important, because of lymphatics follow the course of the blood vessels and also carcinoma of breast metastasizes through veins. The venous drainage consists of superficial and deep venous plexuses. These two anastamose via the inter-glandular system and at their periphery, the very superficial subdermal veins constitute the “circle of Haller” around the areola. From here is formed a plexus with a very wide mesh, the “Subcutaneous plexus of Haller” which drains in to the superficial veins of the region,

- Above into superficial cervical plexus [Anterior and External jugular veins]
- Laterally into cephalic vein via the thoracoacromial vein.
- Below in to the superficial veins of the abdominal wall notably to superficial thoraco-epigastric by communication with the plexus of the opposite breast.

Deep venous drainage accompanies the arterial flow. Intercostal veins course through the azygos and vertebral veins into superior vena cava. The internal thoracic perforators empty into the innominate veins. Pectoral perforators flow into the lateral thoracic vein, which ultimately reaches the axillary vein. The entire venous network of the breast is completely devoid of valves.

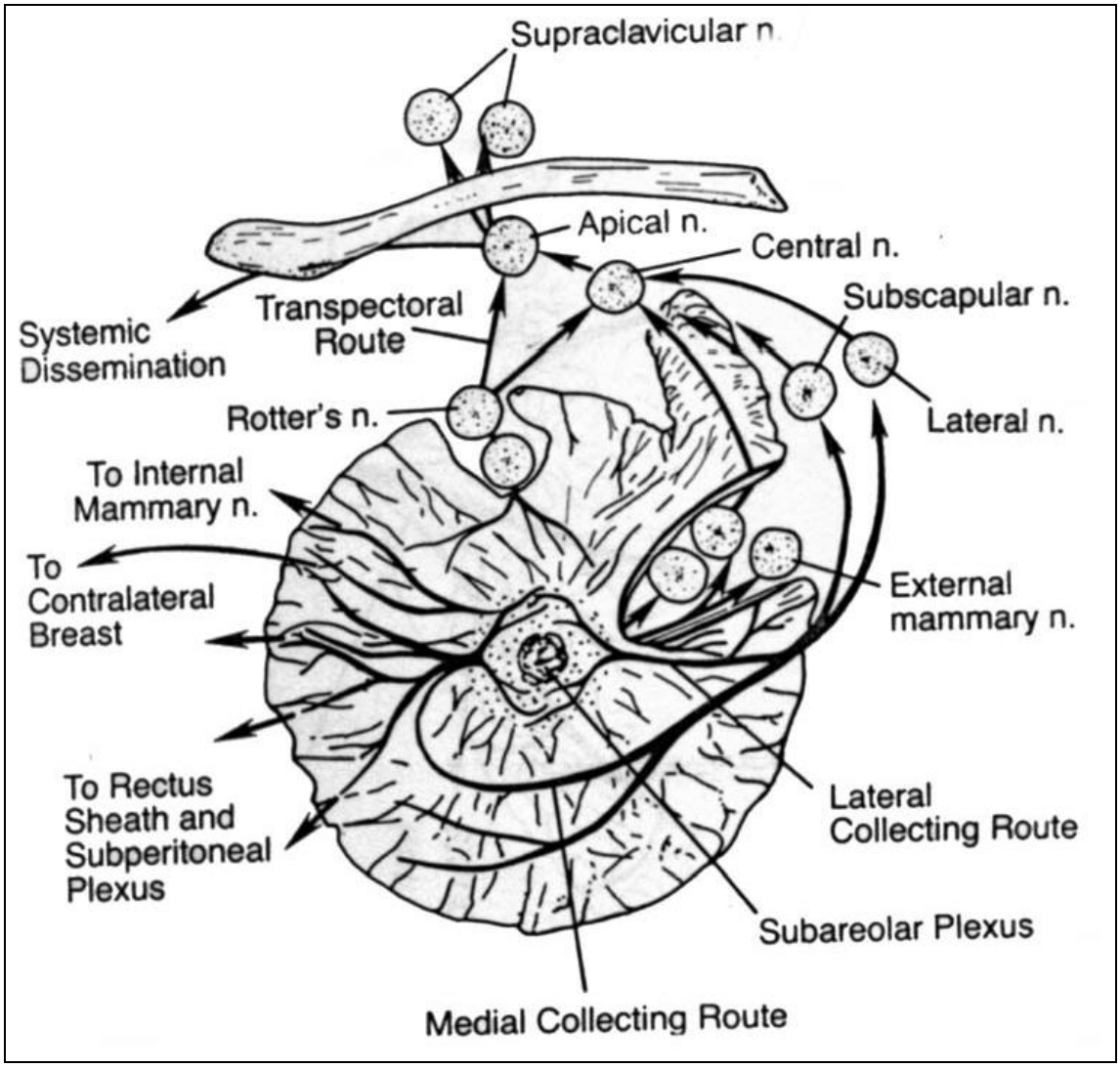
LYMPHATIC DRAINAGE OF THE BREAST

The primary route of lymphatic drainage of the breast is through the axillary lymph node groups. It is essential to understand the anatomy of the grouping of the lymph nodes in the axilla, but the boundaries of group of lymph nodes found in the axilla are not well demarcated. So there is a considerable variation in the names given to the lymph node groups. Anatomists usually define five groups of axillary lymph nodes. Surgeons identify Six Groups of axillary lymph nodes and three anatomic levels. The most commonly used terms to describe the axillary nodes are the following.

1. Axillary vein group
2. The External mammary group
3. The Scapular group
4. The Central group
5. The Subclavicular group
6. The Interpectoral or Rotter’s group

Pict.- 4 : Lymphatic drainage of the breast Schematic drawing of the breast identifying the position of lymph nodes relative to the breast and illustrating routes of lymphatic drainage.

The clavicle is indicated as a reference point. Level 1 lymph nodes include the external mammary (or anterior), axillary vein (or lateral), and scapular (or posterior) groups; Level II, the central group; and Level III, the subclavicular (or apical). The arrows indicate the routes of lymphatic drainage.



Inter pectoral or rotters group: A group of nodes identified by surgeons and not by anatomists. These group consists of one to four small lymph nodes, that are located between the pectoralis major and minor muscles, and in association with pectoral branches of the thoroco-acromial vessels. Lymph from these nodes enters the central and subclavicular nodes.

Axillary lymph nodes are divided according to their lateral and medial relationships with the pectoralis minor muscle into three distinct levels and are defined as level 1,level 2, and level 3.

Level 1 ***:*** Nodes are located lateral or below the lower border of the pectoralis minor, this level includes the external mammary, axillary vein and scapular lymph nodes groups.

Level 2 ***:*** Located deep to or behind the pectoralis minor and include the central lymph node group and some of the subclavicular lymph node group.

Level 3*:* Nodes are located superior or medial to the upper margin of the pectoralis minor and includes subclavicular (apical) lymph node group.

Lymph Flow ***:*** To know the lymphatic drainage of the breast is essential to know the pathophysiology of the breast. Metastatic dissemination occurs predominately by lymphatic route.

Lymphatic flow is multidirectional through skin and mesenchymal [Intra parenchymal] lymphatics. The lymph vessels of the skin and parenchyma are valveless2.They accompany the veins for their flow, flow will be always unidirectional from periphery to right side of the heart. Lymphatic capillaries anastomose and fuse together to form fewer lymphatic channels, that terminates in the thoracic duct on the left side or smaller right lymphatic duct on right side, thoracic duct empties into left subclavian vein. And right lymphatic duct drains into right subclavian vein. Anson, Mcvay and Hagensen found out two accessory directions for lymphatic flow from breast parenchyma to nodes of the apex of the axilla:

1) Transpectoral and 2) Retropectoral routes. Lymphatics of the transpectoral route ie.,interpectoral nodes lies between the pectoralis major and minor muscles referred as“Rotter’s nodes” route begins in the loose areolar tissue of retro-mammary plexus and interdigitate between the pectoral fascia and breast to perforate the pectoralis major muscle and follow the course of the thoracoacromial artery and terminate in the subclavicular (level III) group of nodes.

Retro pectoral pathway drains the superior and internal aspects of the breast. These lymphatic vessels join lymphatics from the posterior and lateral surface of the pectoralis major and minor muscles, these channels terminate in the subclavicular [level III] group.

Three inter connecting groups of lymphatic vessels drain the breast.

- A primary set of vessels originate as channels within the gland in the interlobular spaces and along the lactiferous ducts.
- The vessels draining the glandular tissue and the overlying skin of the central part of the gland, pass into an inter connecting network of vessels located beneath the areola called as subareolar plexus.
- A plexus on the deep surface of the breast communicates with minute vessels in the deep fascia underlying the breast. Along the medial border of the breast lymphatic vessels within the substance of the gland anastomose with vessels passing to parasternal nodes.

More than 75% of the lymph from the breast flows directly to the axillary lymph nodes, while the remainder of the residual lymph passes to parasternal nodes. This anatomic facts provides support for the rationale for lymph node sampling of the axilla to determine the histological status of these nodes and by which the accurate staging by clinically or pathologically been done. Although some authorities have suggested that the parasternal nodes receive lymph primarily from the medial part of the breast but, Turner-Warwick reported that both the axillary and the parasternal lymph node group receive lymph from all quadrants of the breast with no specific tendency for any quadrant to drain medially or laterally. The skin of the breast drains via the superficial lymphatic vessels to the axillary nodes. The anterolateral chest and upper abdominal

wall above the umbilicus demonstrates a specific direction of flow towards the axilla. Below the umbilicus [establishes a "Watershed"] superficial lymphatics carry lymph to the inguinal lymph nodes. Lymphatic vessels near the lateral margin of the sternum passes through intercostal spaces to the parasternal lymph nodes that are associated with the internal thoracic vessels. In the upper pectoral region small number of lymphatic vessels pass over the clavicle to inferior deep cervical lymph nodes.

The lymphatic vessels of the deeper structures of the thoracic wall drain primarily into 3 groups of lymph nodes.

1) Parasternal

2) Inter costal

3) Diaphragmatic.

The parasternal or internal thoracic lymph nodes are a group of smaller lymphatics positioned about 1cm lateral to the sternal border in the intercostal spaces along the internal mammary vessels.

The intercostal lymph nodes represent a small group located in the posterior part of the thoracic cavity within the intercostal spaces near the head of the ribs, one or more nodes are found in each intercostal space with relationship to the inter costal vessels. These nodes receive deep

lymphatics from the postero-lateral thoracic wall, including lymphatic channel from the breast.

The diaphragmatic lymph nodes located on the thoracic surface of the diaphragm. The anterior group includes two or three small lymph nodes also known as prepericardial nodes; that are located behind the sternum at the base of the xiphoid process. Efferent lymphatics from the anterior diaphragmatic nodes pass to the parasternal nodes. The lateral set of diaphrgmatic lymph nodes is comprised of two or three small nodes on each side of the diaphragm adjacent to the pericardial sac; where the phrenic nerve enter the diaphragm. They lie near the vena cava on the right side and near the esophageal hiatus on the left. The posterior set of diaphragmatic nodes consists of a few lymph nodes located next to crura of the diaphragm. These nodes receive lymph from the posterior aspect of diaphragm and convey it to the posterior mediastinal and lateral aortic nodes.

The causes for breast masses range from localized benign nodularity to malignancy. Most common benign lesion is Fibroadenoma. Invasive ductal carcinoma type of breast carcinoma is most common.

For the past several years carcinoma of the breast has been the most common malignancy in woman. However, of all the breast lesions only 40% prove to be malignant **Mac Donald.**[5]

Most agree that there is basic association between benign & malignant lesions. Cystic diseases of the breast are the most common benign lesions. Almost 95% of the mammary lesions will be found to be one of the diagnostic big three **Mac Donald[5].** Viz (1) cystic conditions of the breast (ii) Fibroadenoma (iii) carcinoma.

Disease Frequency (Mac Donald[5])

S.No.	Name of disease	No. of patients	Percentage
1.	Cystic diseases	609	45
2.	Carcinoma	537	40
3.	Fibroadenoma	88	7
4.	Other lesions	111	8

Out of an estimated total of 51.3 million deaths in the world during 1996, more than 7.1 million are attributed to cancer. According to W.H.O. estimates, by the year 2000, the number of cancer deaths may go up to 80 million annually.[6] The eight leading cancer killers worldwide (figure I) which are also the most common in terms of incidence, account for about 60% of all cancer cases and deaths.[9]

Figure I: Ranking order by site of 8 selected cancers

Rank	Males	Females	Total (Both sexes)
1.	Lung	Breast	Lung
2.	Stomach	Cervix	Stomach
3.	Colon/rectum	Colon/rectum	Liver
4.	Prostate	Stomach	Colon/rectum
5.	Oral	Lung	Esophagus
6.	Liver	Oral Cavity	Breast
7.	Esophagus	Ovary	Oral Cavity
8.	Bladder	Body of the uterus	Cervix

Source: 128

Breast cancer is the commonest cancer among females in the developed world followed by cancer of the lung. In 1998 the incidence of breast cancer in the United States was 29.7% of all the cancers of the body.[8] It was also the leading cause of cancer deaths in women in United States until 1986 when it was surpassed by carcinoma of the lung[9,] and currently it stands as the second most common cause of cancer death in U.S.

In India, as in other developing countries (data available till 1996) cancer of the cervix is the commonest cancer in females closely followed by cancer of breast (figure-II), although in some areas like Mumbai the incidence of breast cancer has overtaken that of cervical cancer **Mitra[10].**They have predicted there will be around 85,000 new breast cancer cases each year in India.

Figure-II Burden of cancer, 1996 (in thousands)

Site	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Lung	510	168	477	164	760	229
Stomach	226	147	408	231	486	290
Colon-rectum	273	282	171	149	243	252
Liver	65	34	309	131	263	123
Breast (female)	0	494	0	416	0	376
Esophagus	54	20	266	141	235	123
Mouth-Pharynx	96	32	288	160	207	117
Cervix	0	102	0	421	0	247
Prostate	289	0	111	0	194	0
Bladder	128	41	108	33	105	38
Ovary	0	91	0	100	0	129
Body Of Uterus	0	104	0	69	0	67

EPIDEMIOLOGY AND ETIOLOGY

Various epidemiological factors some of which have been related to the etiology of breast cancer are discussed:

INTERNATIONAL VARIATION

While considering whole world, the incidence rate of breast cancer seen more in North American and North European countries .South Europe and South America are in intermediate state and the lowest rates seen in Asians and Africans. A woman living to the age of 80 years in North America has 1 in 9 chance of developing invasive breast cancer, whereas Asian women have one-fifth to one-tenth the risk of women in North America or Western Europe.[11]

RISK FACTORS FOR CANCER BREAST

1. Age: rate of breast cancer with respect to age.

Age in years	Ratio of breast cancer
30	1 out of 2,525
40	1 out of 217
50	1 out of 50
60	1 out of 24
70	1 out of 14
80	1 out of 10

2. Marital, Reproductive and Breast Feeding History:

Many studies have shown that nulliparous females are at increased risk for breast cancer than multiparous females and the risk is higher in females who bear their first child at 30 years of age or more. The nulliparous females are 30% to 70% more likely to develop breast cancer than multiparous females. Moreover, females who have had their first full term pregnancy at the age of 18 years have a risk about one third that of females who have first full term pregnancy at more than 35 years.

The chance of developing breast cancer is less in married female. Importance of the child bearing function in marriage was demonstrated in **MackIin's** study in which nulliparous females had an equal incidence of breast cancer whether married or single further illustration that the married state is important only in its exposure to certain physiological variables.

The higher percentage of breast cancer among mothers who never did nursing than among controls, suggested that breast cancer patients had a protective effect possibly by suppressing ovarian function[12].

Best sum up the effect of 'age at marriage' 'parity' and 'nursing habits' on the occurrence of breast cancer. They showed that breast cancer is much more frequent in Parsee women (50%) who marry late at an average age of 25, have few children whom they often do not nurse; as

compared to Hindu women (14%) who are very poor, marry early at an average age of 16 and have numerous children whom they usually nurse.[13]

3. DIETARY INFLUENCE

The committee on diet, nutrition & cancer of the National Academy of Science concluded that causal relationship exists between dietary mammalian fat & the incidence of breast cancer. Both the quality & quantity of dietary fat influence the incidence of this disease. Diet, high in fat including alcohol, increases the risk of developing the disease. Vitamin A analogue may be used for breast cancer prevention – (Journal of American cancer society, July 2000).

4. HORMONAL INFLUENCE

The use of combined oral contraception doesn't have effect on breast cancer risk, when used by women of 25 to 39 years age.[16]

Lipnick et a1[17] noted an adverse effect when taken for prolonged period at a very early age or taken before the first full term pregnancy.

Vessey[18] concluded from his studies that estrogen use by perimenopausal & postmenopausal women for hormonal replacement may slightly increase the risk.

5. OBESITY

The risk for obese women is 1.5 to 2 times higher than for non-obese women. This relative risk is restricted to postmenopausal individuals.

6. GENETIC FACTORS

Lynch et a1[19] documented the frequency of sporadic, familial & hereditary breast cancer variants. The risk for developing hereditary breast cancer is determined by pedigree, appears to be independent of age at first pregnancy and is higher when a biopsy confirms atypical hyperplasia.

BRCA 1 a major breast cancer susceptibility gene, is present in most familial breast & ovarian cancer.

BRCA 2, other major breast cancer susceptibility gene is linked to most familial male hereditary breast cancer.

Lilienfeld[20] summarized the results of eight studies, six of which showed a familial tendency to breast carcinoma. According to him the average probability of breast cancer in mothers of probands is approximately double that of the general population and that in sisters somewhat greater- roughly two and a half times the risk in general population.

Reports of symmetrical mammary cancers in homologous twins, several of which have been cited by **Haagensen**[3] have added strength to the inference of an inherited factor. Simultaneous primary malignancies in both breast found in l% of cases could be because of the genetic influence or because of the characteristics of the specific type of breast cancer e.g. lobular carcinomas are known to be multicentric in origin and bilateral.

Breast cancer has been known to occur in association with other cancers. **Taylor** was the first in 1931 to report an association between endometrial cancer and cancer of the breast (which may be related to hormone dependence). It has been noticed that multiple primary cancers involving breast, endometrium and ovary occur more frequently than would be expected by chance. [21,22,23] Women who have cancer of one of these sites have about twice the risk of cancer in another of these sites. Approximately 3.4% of 668 mammary cancer patients reported by Haagensen either previously or subsequently had malignant disease of another organ; the most frequent site was the uterus, followed by colon and rectum.

Irradiation data suggest that women exposed to ionizing radiation from infancy to age ten have an increased risk. **Evans et al[24]** less than l% breast cancer cases results from diagnostic radiological procedures radiotherapy for breast cancer may increase the risk for contra lateral breast cancer[25]. Risk of breast cancer is reduced after radiation treatment for carcinoma cervix as a result of reduction of estrogen.[26]

Exposure to radiation as for therapy of Hodgkin's lymphoma (>3600 cGy) or multiple fluoroscopies (200-300 cGy) especially at younger ages (<30 years) poses an increased risk of breast cancer. [11]

7. Benign breast disease and its association with breast cancer:

The term benign breast disease includes fibrocystic disease, fibroadenoma, cystosarcoma phylloides and a long list of other rare benign diseases including epidermoid cyst of breast.[91]

The incidence of fibroadenoma ("chronic mammary tumors" - as they were initially called by Sir Astley Cooper) in Indian literature varies between 40-87% and it is not related with increased risk of cancer.[27]

The incidence of cystosarcoma phylloides varies widely in India from O.6%[28] to 14.2%[29]. It has a special place among breast tumors because of its peculiar features-it is a locally malignant tumor, usually presents as a large breast lump in middle aged women and is diagnosed by its characteristic microscopic appearance. It does not increase the risk of breast cancer although rarely it can itself metastasize.

Fibrocystic disease has increased risk for breast cancer and this increased risk has been found to persist at least 30 years after the fibrocystic disease has been diagnosed. Large duct hyperplasia, epithelial hyperplasia or papillomatosis and various hyperplastic disorders have been shown to be associated with increased risk of breast cancer. Atypical hyperplasia associated with calcification has been particularly found to be in association with higher risks.

In his series Mohan, 1997 found the following incidence of increased risk associate with benign breast diseases.[27]

Figure–III : Breast lesion with a probable increase risk of cancer.

	No.	**Percentage**
Gross cystic disease	52	4.3
Apocrine metaplasia	18	1.5
Epitheliosis and atypia	4	0.3
Atypical lobular hyperplasia	2	0.2
Multiple intraductal papilloma	1	0.08

Source : 84

The relative risk of occurrence of breast cancer in various benign breast diseases was tabulated by **Dupont[31],** a modified form of which, presented by **Hansen** and **Morrow[32]** in 1998 is shown in figure-IV.

Figure–IV: Benign breast diseases and relative risk for subsequent invasive breast cancer.

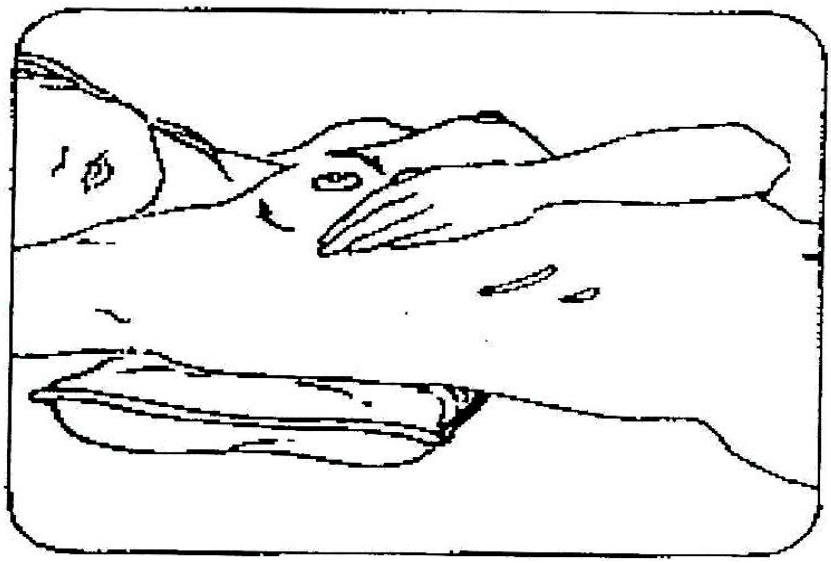
Classification		Relative Risk
Nonproliferative lesions		1 (no increase in risk)
Cyst, micro or macro	Fibrosis	
Duct ectasia	Mastitis	
Fibroadenoma	Metaplasia, squamous or apocrine	
Papillary apocrine changes	Mild epithelial	
Mild sclerosing adenosis	Hyperplasia	
Proliferative lesions		1.5 – 2.0 (slight increase in risk)
Moderate or florid hyperplasia		
Intraductal papilloma		
Florid sclerosing adenosis		
Proliferative lesions with atypia		4.0 – 5.0 (moderate increase in risk)
Atypical hyperplasia,		
Lobular or ductal		8.0 – 10.0 (high risk)
Carcinoma in situ		
Ductal carcinoma in situ		
Lobular carcinoma in situ		

All these changes occur in some but not all cancers, suggesting that the malignant phenotype is due to an accumulation of multiple changes rather than an orderly progression. Thus breast malignancy will present in any way from asymptomatic to distant metastasis.

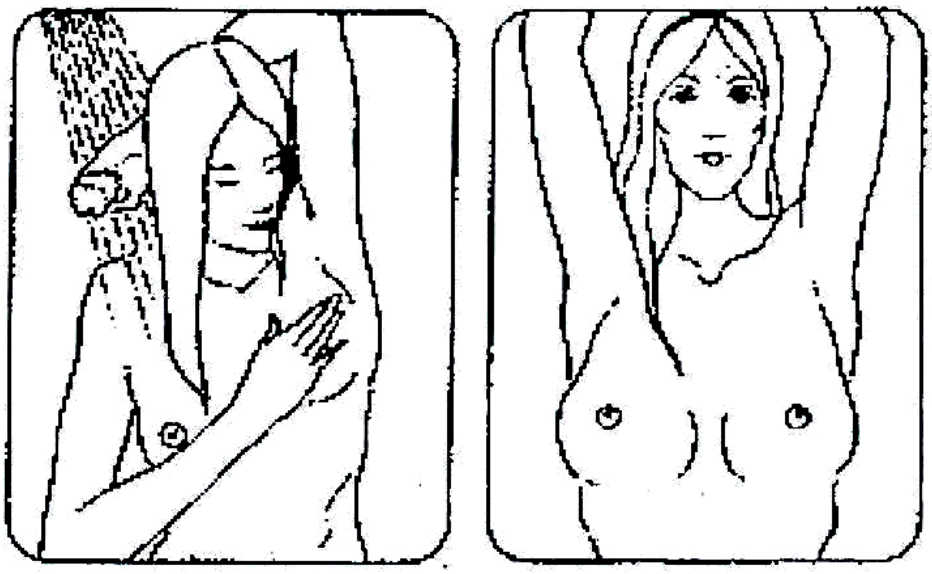
VARIOUS DIAGNOSTIC MODALITIES FOR BREAST LESIONS

(A) CLINICAL EXAMINATION

A complete clinical breast examination (CBE) is the first step to asses both breasts including chest, axilla and regional lymphnodes. In premenopausal women CBE Should be delayed a week, because of breast engorgement during that period. CBE done in upright and supine position. In upright position breast can be visually inspected for asymmetry, nipple discharge, skin changes like oedema, thickening, dimpling, ulceration etc and any obvious mass, unilateral nipple inversion or retraction.



In CBE ,Patient in supine position palpate both breasts, chest, axilla and neck in superficial, intermediate and deep tissue planes by TRIPLE TOUCH TECHNIQUE. Nipple-areola complex to be assessed for any discharge.



CBE sensitivity and precision can be strengthened by examining for long duration using three finger pads and in circular or radial direction in a systematic manner.

Clinical breast examination can detect nearly half of breast cancers and one-third of lesion not detected in imaging. Despite its accuracy, Clinical breast examination should be followed by other investigations in all patients with breast masses.

A proper history and a thorough physical examination is the oldest and yet the most useful and indispensable method of diagnosis. As said by **Haagensen**[3] a clinician who gives more importance to the results of newer diagnostic methods than physical examination of the breast is bound to make errors.

Figure– V: Relative frequency of common clinical symptoms and signs in 100 consecutive patients with cancer of the breast.

Symptom	Order of appearance			
	First Symptom	Second Symptom	Third Symptom	Frequency
Lump	78	9	1	88
local pain	12	28	8	48
Enlargement of lump		16	4	20
Lump in axilla	4	3	1	8
Soreness of nipple	6	2	0	8
Discharge from nipple	4	2	2	8
Retraction of nipple	1	5	2	8
Ulceration	0	5	0	5
Enlargement of breast	1	3	0	4
Attachment to skin	0	2	0	2
Weight loss	0	0	3	3
Hemorrhage	0	0	1	1

Patients with breast disease may present with a variety of clinical complaints, the most common amongst these are : breast pain, nipple discharge and a palpable mass.[32] Overall, breast pain is the most common breast symptom causing women to seek medical attention whereas breast mass is the commonest presenting symptom of cancer of the breast.

The relative frequency of common clinical symptoms and signs in 100 consecutive patients with cancer of the mammary gland has been reported by **Ackerman** (Figure V).[34]

The Ellis Fischel State Cancer Hospital (EFSCH) reported the initial symptoms of mammary cancer in a series of 774 patients as follows:-

Figure. VI: Initial Symptoms of Mammary Carcinoma reported in 774 patients at the ELLIS FISCHEL STATE CANCER HOSPITAL.

Symptom	No. of cases	%age of Total
Painless breast mass	515	66
Painful breast mass	87	11
Nipple discharge	69	9
Local edema	31	4
Nipple retraction	27	3
Nipple crusting	15	2
Local erythema	7	1
Swelling of breast	6	1

Breast abscess	5	1
Axillary mass	2	
Simultaneous breast and axillary masses	2	
Ulceration of the breast	2	
Itching of the nipple	1	
Breast pain	1	
Axillary ulcer	1	
Arm swelling	1	
Puckering of the skin of the breast	1	
Echymosis of the breast	1	

Source: 109

Breast Pain

Mastalgia, the most common breast symptom is more common in premenopausal than postmenopausal women and is rarely associated with breast cancer.

Preece[35] reported that 15% of 240 patients with operable breast cancer had breast pain as a presenting symptom, but only 16 patients presented with mastalgia alone. Breast pain has been related to the hormonal milieu of the breast and the unsuggested causes include an imbalance between estrogen & progesterone with excessive estrogenic stimulation of the breast or a change in the response of the breast tissue to both estrogen and progesterone[36]

As described by **Hansen and Morrow**[32] mastalgia could be *cyclic* or *noncyclic.* Cyclic mastalgia which is more common of the two is associated with the menstrual cycle and is maximal pre-menstrually. This cyclic pain is usually bilateral, poorly localized and described as heaviness in the breast. It occurs more commonly in younger women and usually resolves spontaneously. Non cyclic mastalgia on the other hand is most common in women in their 40's and is often unilateral and described as a sharp burning pain which appears to be localized within the breast. Non-cyclic mastalgia is usually secondary to an underlying breast lesion which should be treated. It has been suggested that in a patient with persistent, localized breast pain, the possibility of breast carcinoma should always be excluded.

Nipple Discharge:

Hansen and Morrow[32] suggested that this common complaint is usually due to a benign process. It has been reported in 1O% to l5% of women with benign diseases and in 2.5% to 3% of women with carcinoma.[11] The first step in the evaluation of nipple discharge is to determine whether it is *physiologic* or *pathologic*. *Physiologic* discharges are characterized by- discharge only on compression, multiple duct involvement and often bilaterality. Discharges are classified as *pathologic* if they are spontaneous, bloody, or associated with a mass. These discharges are usually unilateral and confined to one duct. **Spratt**[37]

suggests that nipple discharge in a non-lactating breast is an abnormal conditions. Duct papilloma is implicated as the commonest cause of abnormal nipple discharge.

Abnormal nipple discharge has been reported by different workers as a sign of malignant disease in 18 to 47 percent of Cases.[8,38,39] The characteristics of the discharge cannot be associated invariably with either benign or malignant process. In two third of the patients with mammary carcinoma reporting nipple discharge in the EFSCH series (figure VI) the discharge was bloody and in the remainder it was serous or cloudy. As a differential point **Copeland**[40] pointed out that a sero-sanguinous or bloody discharge is more often benign in patients less than 50 years and is more often due to cancer in those more than 50 years.

Breast Mass of all the patients presenting with breast masses at least 30% have no disease."

Fibroadenoma or 'breast mouse' as it is often called occurs mostly between 20 and 50 years (it is the commonest tumor of the breast below 35 years-**Bailey and Love**[41] and is recognized by its characteristic clinical presentation of a well defined and an extremely mobile breast lump. It is usually solitary but may present as multiple lesions in 1O% to l5% of cases.[42]

The non-proliferative lesions are associated with no increase in the risk of breast cancer development (fig. IV) and account for 70% of those palpable breast masses.[31]

Other signs:

Apart from the above mentioned presentations other signs should also be carefully looked for[4] viz. asymmetry of the breast, retraction of skin/nipple, ulceration, excoriation of the nipple, lump in the axilla. It is universally accepted now that axillary lymph node metastasis is the most important prognostic indicator of breast cancer.[3,41,43] and size of the tumor is a good clinical indicator of the extent of axillary lymph node involvement.[44]

Two important nipple changes produced by carcinoma are inversion and Paget's disease.[45] Paget's disease of the nipple is one of the most visible but deceptive diagnostic signs of breast cancer. **Haagensen**[3] has described a useful clinical guideline for assessing lesions of the nipple

- Lesions confined to the **nipple only** are **almost always** Paget's disease.
- Lesions including **nipple** and **areola** and even surrounding skin are usually Paget's disease.
- Lesions involving **only areola or skin are benign dermatitis.**

MALE BREAST CANCER

Cancer of the male breast is rare and accounts for about 0.6% of all breast cancers.[41,89] The most frequent types (about 90%) are invasive ductal carcinomas.[90] An estimated 1400 cases of breast carcinoma in males versus 180,200 cases of breast carcinoma in females were diagnosed in the U.S. in 1997 (Parker). It has a similar natural history as that of female breast cancer. It's characteristic features are

- ❖ The mean age at diagnosis of male breast cancer is 60 years which is 5-10 years later than in women.[46]
- ❖ The commonest present complaint is a painless mass beneath the areola. Other features will be same as in female like nipple discharge, retraction, ulceration, axillary swelling etc…

- ➢ More or less all types of female breast cancer occurs in male excluding lobular variety.[47] One case of lobular breast carcinoma in males has now been reported at Tata Memorial Hospital. The commonest histological type reported is infiltrating duct cancer 84.8%[48].
- ➢ It shows an increased propensity to estrogen receptor expression.[48] Hormonal abnormalities resulting from liver disease increase the risk.

- Gynaecomastia is not a premalignant state; and men XXY phenotype have a 20-fold increase in the risk of breast cancer.[47]
- Stage for stage, male breast cancer carries the same prognosis as in females.

Finally it must be mentioned that the clinician should develop a high skill in diagnosing breast cancer at an early stage. In this effort, it is important to keep in mind that five groups of women are particularly predisposed to develop the disease as outlined by **Haagensen**[3]

- ✓ Women who have a family history of breast cancer.
- ✓ Women who have had gross cystic disease of the breast.
- ✓ Women who have had carcinoma in one breast.
- ✓ Women who have been found to have lobular neoplasia (lobular carcinoma in situ) in either breast.
- ✓ Women who have had multiple papilloma in either breast.

Moreover, **Haagensen**[3] has also listed the common errors made by the clinicians, as a result of which they miss the diagnosis of breast cancer. They should always be kept in mind and are as follows -

1) Treating the patient for some other disease when she or he will be having obvious tumor.
2) Failure of the clinician, in his palpation of the breast, to feel the tumor that the patient had discovered and for which she came to consult him.
3) Mistaking a carcinomatous tumor of the breast for a breast infection.

Mention must be made here of a special entity called ‘mastitis carcinomatosa’ or Inflammatory carcinoma of the breast.[49] It is characterized by rapid rate of growth along with pain, redness of skin, warmth and cutaneous edema and so it often mimics an inflammation of the breast. Apart from this, chronic consolidated breast abscesses which often present as a lump and mild pain may also simulate breast cancer.

1. Wrongly diagnosing a carcinomatous tumor of the breast as a benign lesion, and failing to advise biopsy or excision.
2. Careless treating of patients with acute sharp pain in breast.
3. Disregarding a definite retraction sign.
4. Not evaluating the reason for nipple discharge.
5. Relying upon negative aspiration biopsy.
6. Relying on mammography rather than palpation.

(B) FINE NEEDLE ASPIRATION CYTOLOGY (FNAC)

All patients with palpable breast masses are initially proceeded with FNA Cytology.in FNAC 22-to25-gauge needle is used. some cysts usually disappear with aspiration. Its better to image breast before FNA because of cyst wall disruption during aspiration. Otherwise after two weeks of FNA procedure you can go for imaging and better to intimate radiologists regarding FNA.

FNA can be done under image guidance either steriotactically or sonographically. When sample is adequate the sensitivity of FNA goes up

to 99% for malignancy. Accuracy rate of FNAC depends on sample adequacy and physicians skill.so that its positive predictive value in malignancy goes up to 99% and negative predictive value may vary from 86 to 99%.

Kun[50] in 1847 described "a new instrument for the diagnosis of tumors". In 1883 Leyden used needle aspiration for the diagnosis of pneumonia. **Menetrier**[51] in 1886 was the first to use it for the diagnosis of lung cancer. Some years later in 1904, **Greig & Gray**[52] diagnosed trypanosomiasis in lymph node aspirate from patients with sleeping sickness.

There was then a lapse of papers on needle aspiration until **Guthrie**[55] published his account in 1921 of using a 21 gauge needle, but it attracted little interest. The first ideological and practical impetus to aspiration cyto-pathology came in 1927 when **Dudgeon and Patrick**[54] proposed needle aspiration of tumors as a means of rapid microscopic diagnosis. This idea was taken up in early 1930s by **Hayes E, martin**[55] and Edward B. Ellis. The first large scale study was carried out by the pioneering team.[55,56] In spite of their extensive work & experience FNAC did not become popular. It was however, the publications from the Radiumhemmet of the Karolinska Hospital in Stockholm that brought aspiration cytopathology to international attention and the highly influential work by **Franzen and Zajiceck**[57] renewed interest in the procedure.

The procedure

The fundamental requirement for FNAC of the breast is that a mass is palpable or that a mass has been identified by mammography,[58] so that it can be approached under radiological guidance by a needle. Aspiration is best performed with a syringe in a Cameco syringe holder.[59] Various refinements of this technique have been described such as the use of multi-hole needle[60] or vacuum tubes as for venepuncture.[61] **Zaldela et al[62]** advocated employing only a needle for multiple punctures. Use of thin needles was popularized by European workers before which needles of thicker caliber were used.

Staining is done either by May-Grunwald-Giemsa (MGG) stain on air dried slides (which better demonstrates the cytoplasmic detail) or by papanicolaou stain on alcohol fixed slides which gives excellent nuclear details.[63] Some cytologists however prefer H and E slides.

Advantages

FNAC is a safe and quick technique which can be done on OPD basis with little equipment and cost. It causes minimal inconvenience to the patient. It is highly specific for the diagnosis of malignancy. On occasions it can be therapeutic.

Disadvantages[59]:

- A high degree of skills required
- A percentage of aspirates are unsatisfactory.

- Classification of the type of cancers is sometimes difficult.[64]
- Adequate material is difficult to obtain in very small breast lumps.
- The most serious disadvantage of FNAC is that a negative report is unreliable.
- Final diagnosis cant arrived with FNA report alone

Complications

Although the incidence of complications due to FNAC of breast is very less, they are known to occur[58] and include

- Pneumothorax — the most important and serious.
- Haematomas at the site of needle aspiration are common and may result in false positive mammograms after aspiration and so a mammogram should be done after at least 2 weeks of FNAC.
- Acute mastitis is a rare complication.[65]

Additional applications of FNAC: Apart from cytological diagnosis, the aspirated cells can also give other information.

- Analysis of steroid receptors-estrogen and progesterone can be done using the immunoperoxidase technique.
- Detection of tumor-associated antigens and other tumor related proteins employing immunoperoxidase technique e.g. cytokeratins, CEA, NSE, S-100 protein etc.

- ❖ Electron microscopy can also be applied for ultrastructural evaluation.
- ❖ S-phase fraction by flow cytometry and DNA content of cells by morphometry can be calculated. These give information about the growth potential of the tumor cells and may predict the risk of recurrence.

(C) MAMMOGRAPHY

Mammography can be diagnostic and screening modality. By using spot compression view and magnification view we can improve its accuracy. Diagnostic mammography is up to 87 percent sensitive in detecting cancer. Its specificity is 88 percent, and its positive predictive value may be as high as 22 percent.

Mammography may be done either as a diagnostic or screening procedure. Woman more then 40 years can be imaged better with mammography because of less fibroglandular tissue

A conclusion arised to screen women between 50 to 69 years using mammography as a results of one metanalysis, which shows 26% reduction in breast cancer mortality among women screened at ages of 50 to 74

Screening women less then 40 years using some guidelines doesn’t show better cancer detection rate.

In 1913 **Albert Salomon**[66], a German surgeon, correlated the clinical, pathological and roentgenologic characteristics of 3000 amputated breasts and noted many of the roentgenographic features of breast tumors. He was able to distinguish some infiltrating from non-infiltrating carcinomas and to recognize some non-palpable breast cancers. **Stafford**

Warren[67], a radiologist, pioneered clinical mammography in 1930's. However, mammography was never widely used because of technical difficulties.

In the 1950's **Raul Leborgne**[68] in Uruguay revitalized interest in mammography when he reported the radiographic appearance of carcinoma micro-calcifications and performed histopathologic correlations. Further work was done in 1950's by Jacob **Gershon-Cohen** in Philadelphia, who identified many features of benign and malignant lesions.

In 1960 **Robert Egan**[69] in Houston introduced a reproducible method of obtaining diagnostic X-ray examination of the breast using a high mili-amperage, low-kilovoltage technique and industrial film.

In the mid 1960's the first x-ray unit designed for mammography was introduced by **Gros**[70] in France. This dedicated mammography unit used a molybdenum anode for better soft tissue imaging and a breast compression device to eliminate motion and improve image quality.

Another important advance came in 1972 with the introduction of film screen mammography, which permitted rapid automatic processing, shorter exposure, and sharper images.[71]

The procedure

Mammographic examination can be done for screening as well as for diagnostic purposes. In diagnostic mammography 2 views are taken for each breast cranio-caudal and medio-lateral oblique view. Usefulness of a third view-the oblique view, has also been described by **Lundgren.**[72]

The breast is compressed between two plates before taking the mammogram. Compression of the breast provides several advantages

- Holds the breast motionless.
- Separates the tissues to disclose small lesions.
- Improves image quality by decreasing scattered radiation.
- Reduces the radiation does by decreasing breast thickness.

MAMMOGRAPHIC APPEARANCES

Normal Breast:

The breast consist of a glandular portion and fibro-fatty stromal portion. The fibro-glandular tissue appears radio-opaque whereas the fatty tissue radiolucent.

The breast of younger women consists mainly of dense fibro-glandular tissue which appears radio-opaque and this often limits the accuracy of the mammogram. With increasing age and after child bearing the dense glandular tissue is replaced by radiolucent fat, allowing abnormalities to be detected more readily. Thus mammography is more useful in identifying lesions in fatty breasts of old females.[73]

Malignancy:

The mammographic features of malignancy can be divided into Primary, Secondary and indirect signs.[74]

The primary signs include a mass of relatively high radiographic density, micro-calcifications or both. An irregular mass with spiculated margin is the most important mammographic feature indicating malignancy. The more highly infiltrative lesion, the more spiculated the margin will appear in the mammogram.[74] The malignant calcifications may occur with or without a mass. The micro-calcifications are typically numerous and clustered, of various sizes and shapes, and may have a branching configuration. The greater the number of calcifications in a cluster, the greater the likelihood of malignancy. A cluster is defined as three or more calcifications in an area of 0.5 cm^2.

Secondary signs such as skin thickening and retraction are usually obvious clinically.

Indirect signs of malignancy that may be the only evidence of non-palpable cancer include architectural distortion, the appearance of a neo-density, parenchymal asymmetry and a unilateral focus of one or more prominent ducts. As many as 20% of non palpable breast cancers may be indentified on mammograms by subtle indirect signs.[95]

Benign masses:

In contrast to Infiltrative margins of most carcinomas, the majority of benign masses such as cysts, fibroadenomas have sharply circumscribed margins. Benign calcifications are more often evenly scattered. Calcifications of fibroadenomas are usually coarse.

Indications: Mammography is indicated as a diagnostic procedure.

- When clinical finding are suspicious.
- Prior to any breast biopsy.
- For detecting occult breast cancer when axillary lymphadenopathy is the only presentations.[3]

Disadvantages[74]:

- Although mammography is highly sensitive in identifying breast cancers at an early stage it has poor specificity and so should not be solely relied on.

- Masses with spiculated margins are usually malignant but similar appearance may be seen in radial scars, sclerosing adenosis, posttraumatic fat necrosis. Calcifications of fibrocystic disease often mimic those of malignancy leading to unavoidable false positive results. Calcific-like deposits in the skin secondary to tattos, deodorants, ointments or sebaceous gland secretions can also be mistaken for malignancy.
- Early mammograms resulted in a radiation dose of approximately 1 to 4 rads. Today a two-view film screen examination leads to an average glandular dose of 0.04 to 0.08 rads. Although the doses used in mammography are very small, they are hazardous to those who are unusually sensitive to radiations eg. l-2% of persons with Ataxia-telangiectasia gene.

Hardesty et al[77] One important indicator of the quality of screening mammography program is positive predictive value PPV1. Optimal PPV1 depends on sensitivity and recall rate. Optimal (maximum) PPV1 can occur at any sensitivity level.it should not be followed as a sole indicator because it misses many malignant breast mass.

Lee et al[78] assessed the imaging findings of inflammatory breast cancer. They retrospectively analyzed the mammography, ultrasonography and magnetic resonance imaging (MRI) findings of nine

patients with inflammatory breast cancer. Inflammatory breast cancer showed skin thickening and nipple-areolar swelling on mammography, ultrasonography, and MRI. Tumor with lymphatic dilatation on ultrasonography and enhancement of thickened skin and parenchyma on MRI can be useful findings in the diagnosis of inflammatory breast cancer.

(D) ULTRASONOGRAPHY (USG)

Ultrasonography is mainly used to find out whether the mass is cystic or solid. The sensitivity of ultrasound goes up to 89% if the mass is cystic in nature. Further investigations are needed only if cyst has malignant feature.

Ultrasound images dense breast tissue better then mammography.

Ultrasonography does not have a role as a single or initial study in screening for breast cancer. However it can be used if the mass is too small or too deep for FNA and if patient refuses FNA.

If ultrasound diagnose simple cyst ,the risk of simple cyst going for malignancy is very low. One study found no cancers in 223 cysts. However, some experts recommend FNA if a simple cyst is found at the site of a palpable mass.[101]

Young women <30 years with high risk for malignancy like having family history, BRCA mutations can go for ultrasound imaging.

The breast ultrasound is not approved by the U.S. Food and Drug Administration (FDA) as a screening tool for breast cancer because it is inferior to mammography. Mainly ultrasound is used to evaluate breast abnormalities detected in mammography and in those patients where mammography is contraindicated.

It has far lower sensitivity and specificity than mammography. The main limitations of USG include poor results with fatty breasts, inability to depict microcalcifications and inconsistent detection of solid lesions smaller than 1 cms.

It is most appropriate for differentiating cystic from solid masses found by palpation or on mammograms, with high accuracy rates. The most diagnostic feature of a cyst is an anechoic interior.

Materials and Methods

This is a retrospective study carried out in the department of General Surgery, Government Rajaji Hospital, Madurai Medical College, Madurai.. Patients presenting in the surgery OPD between August 2010 to September 2012 with complaints of lump & other complaints in the breast who were admitted and subsequently operated were included in the study. The total number of cases studied were 80.

The following protocol was followed in each case admitted with lesions in the breast

(a) Clinical examination.

(b) FNAC

(c) Mammography

(d) Ultrasonography

(A) Clinical Examination: A detailed history was taken and thorough physical examination was done.

Apart from the chief complaints along with duration of symptoms, family history, menstrual history and reproductive history was also taken. Examination consisted of general and local examination. Local examination included examination of both the normal and diseased breast. The site, size, shape and number of lumps, consistency, mobility, tenderness, skin changes and nipple changes, were noted. Routine

investigations were done preoperatively which included Hb%, TLC, DLC, Blood sugar, Serum creatinine, Liver function tests (in patients suspected of having malignancy), chest X-ray.

(B) FNAC: The needle aspiration cytology was done in all patients before surgery.

The cases selected gave the consent for the procedure and were investigated as follows.

- ❖ Detailed clinical history including present and past illness.
- ❖ Systemic examination and local examination with due care.

Material: The following equipments were used

- ❖ 10 cc, 20 cc sterilized disposable syringe.
- ❖ Disposable sterilized needle of 21, 22 and 23 gauge.
- ❖ Spirit swab, clean glass slides, 95% alcohol as fixative agent, reagents for Haemotoxyline and Eosin staining.

Method

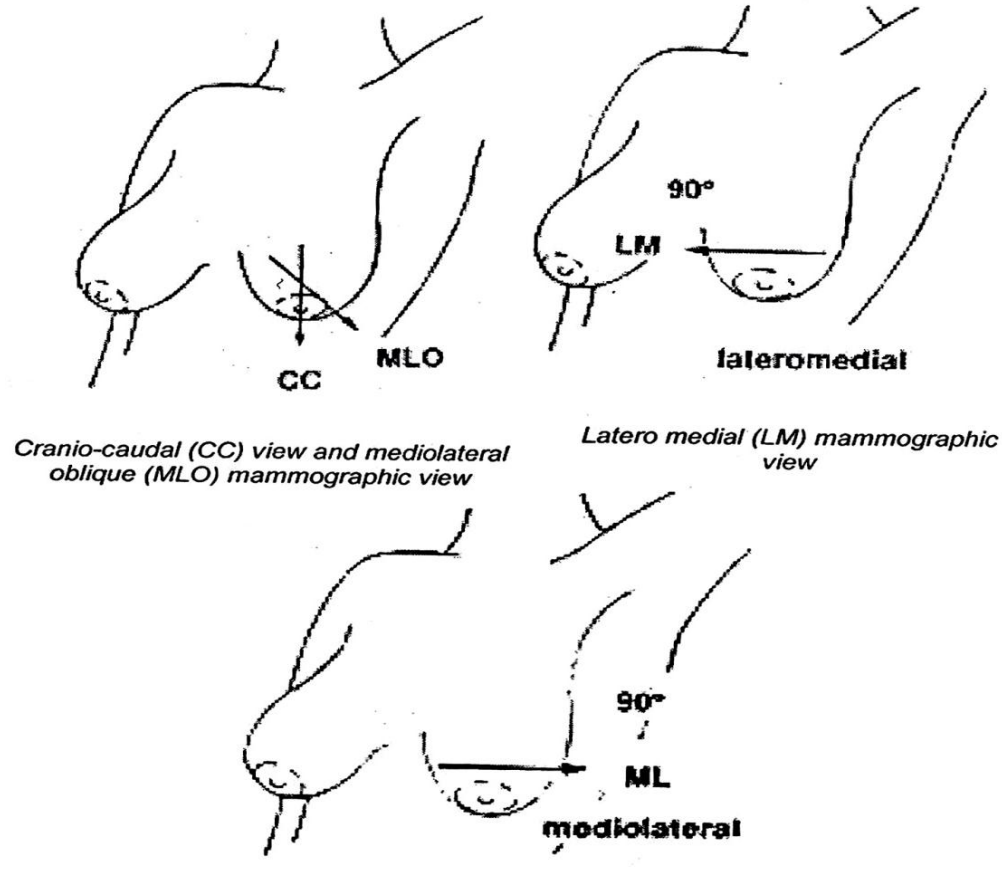
FNAC will be performed by 20 ml disposable syringe with 21 gauges x 1.5 inches needle. Upon obtaining the material, aspirate will be smeared on slides. It will then be fixed in 95% ethanol. After being fixed the smear will be subjected to staining by hematoxylin eosin stain. In most cases adequacy of the aspirate was assesed immediately.

The slide thus prepared was visualized under microscope for cytomorphological study. The cases were classified into categories according to their cytological features.

(C) Mammography: Mammography was done in 80 cases.

Material: Mammography was done by a machine specifically dedicated for the purpose-"Mammography unit model III". It consists of a C-arm which can be moved in all directions. The distance between the X-ray tube and the platform on which the breast rests remains fixed. Another movable plate made of plexiglass lies close to the platform and provides compression to the breast. The movement of the plate can be controlled by a foot switch. The X-ray dosages applied to the breast can be set automatically. As with all modern mammography units, grid is present to improve the image quality. The cassette for mammography contains an X-ray plate with the coating of the ultra sensitive material only on one surface (unlike conventional X-ray plates). Along with this is a film screen for absorbing the excessive radiations.

Method: After explaining the procedure to the patient mammography was done in strict privacy in the presence of a female technician. Mammography is always done on both breasts and three views were taken for each breast (A) cranio-caudal view and (B) The medio-lateral view (C) Lateral medial view. The patient stands erect sticking as close to the device as possible.



Cranio-caudal (CC) view and mediolateral oblique (MLO) mammographic view

Latero medial (LM) mammographic view

Medio lateral (ML) mammographic view

Maximum portion of the breast was made to rest on the fixed platform and compression was provided by the movable plexiglass plate. The voltage, mili-ampere and the exposure time are automatically set depending on the density of the breast. The usual dosages employed are 23-28 kv and 100- 400 mA. For an exposure period between 0.06 to 0.08 secs, the head of the patient was turned to one side, the patient was asked to hold her breath and the mammography was taken. After viewing the other breast, the C-arm of the machine was rotated and a mediolateral view of both the breasts was obtained.

The plates were developed immediately and analyzed to see their quality so that repeat mammograms could be taken if required.

(D) Ultrasonography

Out of 80 cases, ultrasonography was done in all 80 cases.

Ultrasonography of the breast is one of the imaging modalities used mainly to detect abnormalities in dense breast tissue like in young women. Basic physics is high frequency sound waves are directed through probe to breast which are reflected back as echo and images are created.

Method:

Always with clinical & mammographic findings of both breasts ultrasound should be proceeded.

Ultrasound was done with a linear-array broadband transducer with a center frequency of 10 Mhz.In a larger breast a linear-array transducer with a center frequency of 7.5 MHz are supplemented for better penetration. patient usually kept in supine position to scan inner region of breast. For the outer breast, the patient was placed in the contralateral posterior oblique position with the ipsilateral arm raised. Survey scanning was done in transverse and sagittal planes. Both radial and antiradial scanning planes were used to measure discrete lesions. When multiple suspicious lesions were noted and to calculate distance between lesions panoramic view was used.

Observation

Eighty cases of breast lesions were included in this study and an attempt was made to differentiate them into two broad categories-the benign (including cystosarcoma phylloides) and the malignant by:

(A) Clinical examination

(B) FNAC

(C) Mammography

(D) Ultrasonography

(A) CLINICAL EXAMINATION

Following observations were made with regards to clinical examination of all the eighty cases included in this study.

(I) Age: The age of the patients varied from 13 to 70 years. The youngest patient with benign breast lump was 13 years and the oldest 45 years; and with malignant breast lump was 35 years and 70 years respectively. The 45-year-old patient with benign breast disease was of cystosarcoma phylloides. The oldest patient with fibroadenoma was of 35 years of age. 27 out of the 31 cases of benign lumps were below 30 years

whereas 43 out of 49 cases of malignancy were between 30-60 years of age. An increase in incidence of malignancy was noted with advancing age as shown in the following table:

TABLE 1

AGE DISTRIBUTION OF CASES WITH BENIGN AND MALIGNANT BREAST DISEASES

Age group (in years)	No. of cases			
	Benign	Malignant	Total	%age
11 – 20	10	0	10	11.6
21 – 30	17	0	17	21.6
31 – 40	3	14	17	21.6
41 – 50	1	19	20	25.0
51 – 60	0	10	10	30.0
61 – 70	0	6	6	6.6

(II) Sex: All cases were females.

(III) Religion: 70 patients were Hindus,8 were Muslims and 2 were Christians. All the 31 patients with benign lump were Hindus and 8 Muslims and 2 Christian patients had malignancy.

(IV) Socio-economic Status (SES): 70 patients were from low SES, 10 belonged to middle class.

(V) Marital Status: There were 8 unmarried patients, all of whom had fibroadenoma.

(VI) Menstrual History: Premenopausal – 44; Perimenopausal – 25; Postmenopausal – 11.

Out of 80 female patients the menopausal status was as shown in the following table.

TABLE 2
MENOPAUSAL STATUS OF 80 PATIENTS WITH BREAST LESIONS

Menopausal Status	No. of cases		
	Benign	Malignant	Total
Premenopausal	30	14	44
Perimenopausal	1	24	25
Postmenopausal	0	11	11

35 out of the 49 patients with malignancy were peri or post menopausal and 14 were premenopausal. None of the patients with a benign breast lump was postmenopausal.

(VII) Family History: None of the patients had a positive family history in 1st and 2nd degree relatives.

(VIII) Symptoms and signs: Breast lump which was found in all the 80 cases. Pain was the next most frequent symptom.

On examination of the breasts, the clinical findings were confirmed. Axillary lymphadenopathy was found in 18 patients out of which 16 were of malignancy, and two cystosarcomas.

TABLE 3

PRESENTING SYMPTOMS OF 80 PATIENTS WITH BENIGN AND MALIGNANT BREAST LESIONS

Symptom	No. of cases			
	Benign	Malignant	Total	%age
(a) Local				
(I) Lump	31	49	80	100.00
(II) Pain	13	16	29	36.25
(III) Nipple Discharge	4	10	14	17.5
(IV) Retraction of nipple	0	16	16	20.0
(V) Ulcer	0	16	16	20.00
(VI) Skin Edema	0	11	11	13.75
(VII) Flattening of nipple	1	7	8	10.0
(VIII) Lump in Axilla	2	16	18	22.5
(b) Systemic				
(I) Anorexia	0	8	8	10.0
(II) Weight Loss	2	14	16	20.0
(III) Fever	0	7	7	8.75

(IX) Duration of symptoms: The duration of symptoms (from the time of first noticing the symptom to the time of presentation) varied from 1 month to 5 years for benign and from 1 month to 4 years for malignant

disease. The average duration of symptoms for malignant disease was approximately 6 months.

(X) Number of Lumps: Multiple (four) lumps were found in one patient of fibroadenoma. Rest of the cases had a single lump.

(XI) Laterality: Left side was affected more than the right as shown in Table 4.

TABLE 4

DISTRIBUTION OF CASES ACCORDING TO THE SIDE OF INVOLVEMENT IN BENIGN AND MALIGNANT BREAST LESIONS

Side	No. of cases			
	Benign	Malignant	Total	%
Right	10	23	33	41.25
Left	14	26	40	50.0
Bilateral	7	0	7	8.75

Seven cases with bilateral fibroadenoma were operated on both sides. Bilaterality was not seen in any of the malignant cases.

(XII) Site: As shown in Table 5 the lumps showed a predilection to the upper half of the breast being more distributed in outer and inner quadrants of the upper breast.

TABLE 5

DISTRIBUTION OF CASES ACCORDING TO THE SITE OF INVOLVEMENT OF THE BREAST

Part of Breast involved	Benign	Malignant	Total	%age
Upper Outer	13	20	33	41.25
Upper Inner	9	15	24	30.0
Lower Outer	1	8	9	11.25
Lower Inner	3	0	3	3.75
Central	3	4	7	8.75
More than one quadrant	2	2	4	5.0

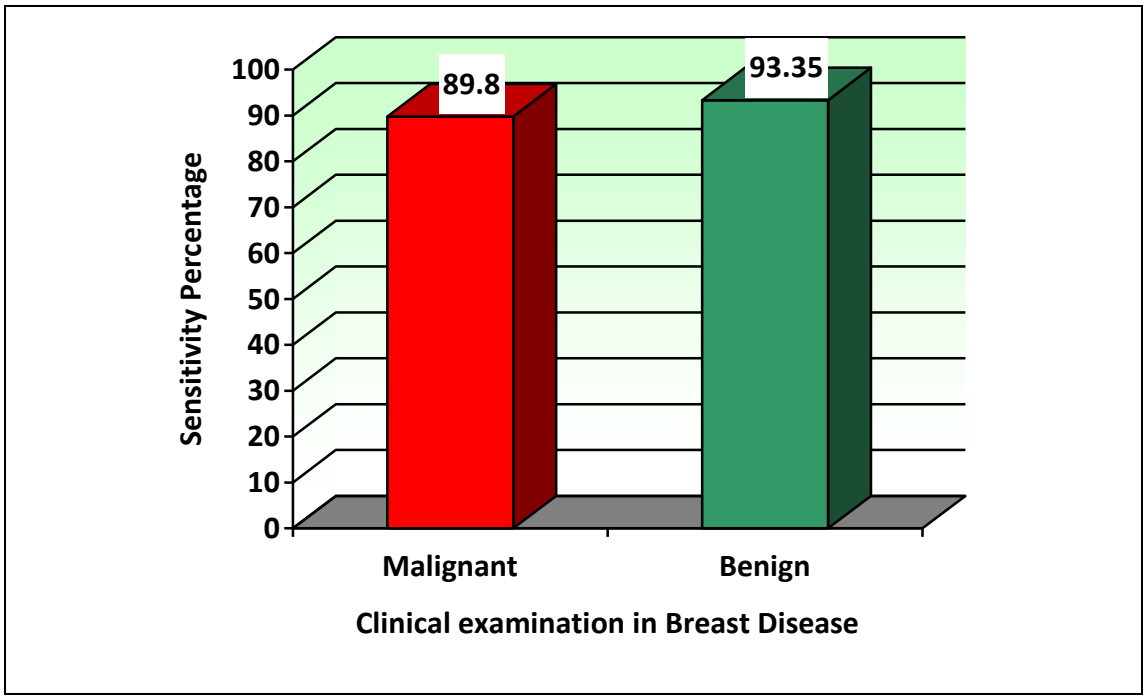
(XIII) Accuracy: Clinical examination was accurate identifying the benign of lesions as 93.35% and malignant lesions as 89.80% respectively.

TABLE 6

DIAGNOSTIC ACCURACY OF CLINICAL EXAMINATION

Type of lesions	No. of cases		
	Cytological diagnosis	Correctly diagnosed clinically	%age
Benign	31	29	93.35
Malignant	49	44	89.80

Graph–1: Diagnostic Accuracy Of Clinical Examination



(B) FNAC: FNAC was performed on all 80 patients preoperatively. The result of FNAC and their correlation with clinical cases are shown in table 7.

TABLE 7
RESULTS OF CYTOLOGICAL EXAMINATION

No. of cases			
Correct Cytological diagnosis		**Clinical diagnosed**	**% age**
(A) Benign			
Fibroadenoma	27	27	100%
Fibrocystic disease	2	0	0%
Cystosarcoma phylloides	2	2	100%
Total	31	29	93.55%
(B) Malignant	49	44	89.80%

Graph–2:Results of Cytological Examination

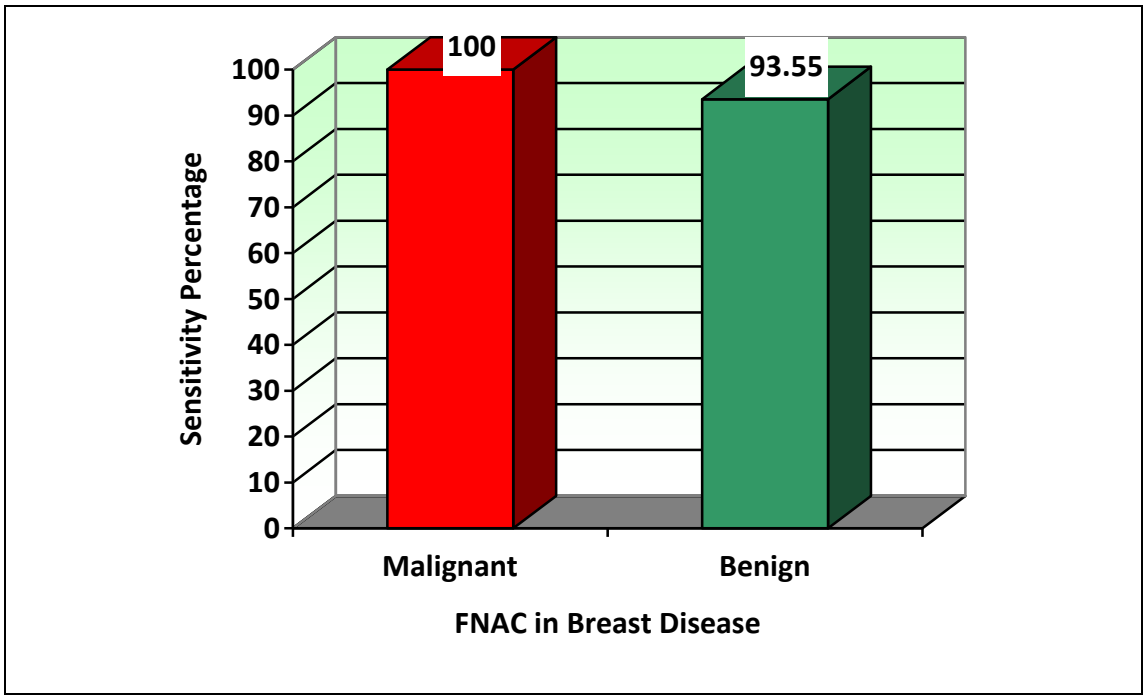


TABLE 8

ACCURACY OF FNAC IN 80 PATIENTS OF BREAST LUMP AND CORRELATION WITH HISTOPATHOLOGY

No. of cases			
Histopathological diagnosis		**Cytological diagnosis**	**% age**
Correct	80	80	100%
Incorrect	0	0	0%

(C) MAMMOGRAPHY: Mammography was done on all 80 patients and the results were as follows:

TABLE 9

MAMMOGRAPHIC DIAGNOSIS

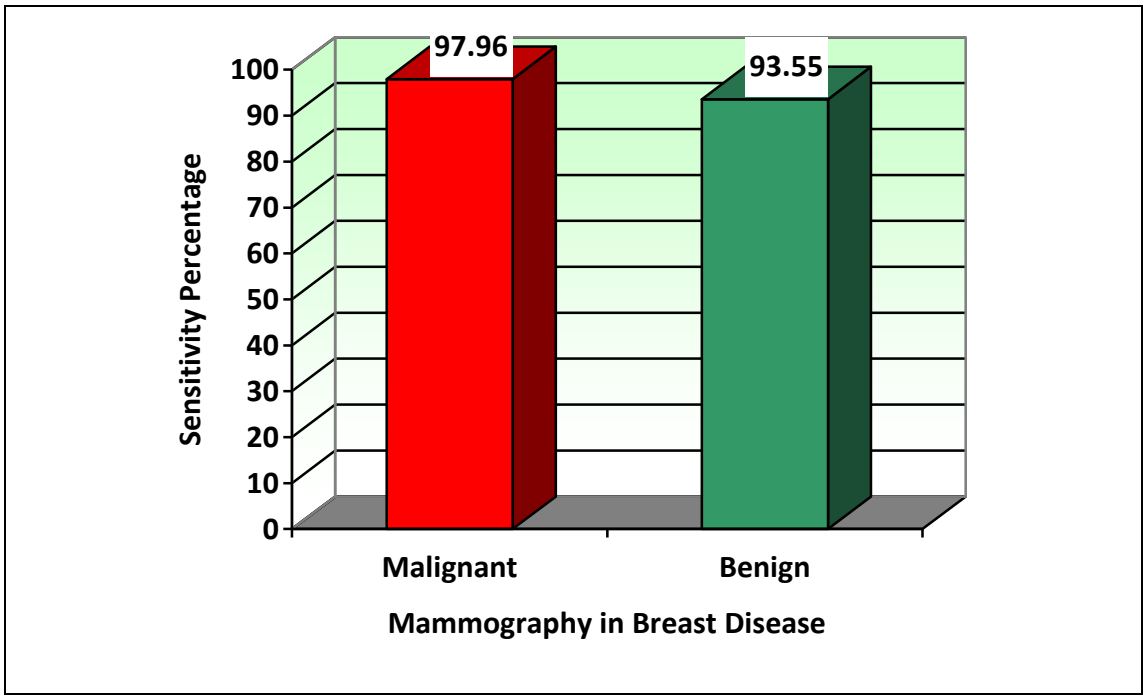
Mammography Diagnosis	No. of cases
Malignancy	49
Fibroadenoma	25
Phylloides tumor	2
Fibrocystic disease	2
Inconclusive	2

TABLE 10

ACCURACY OF MAMMOGRAPHY IN DIFFERENTIATING BENIGN AND MALIGNANT LESIONS

	No. of cases		
	Cytological diagnosis	Correctly diagnosed	%age
Malignant	49	48	97.96
Benign	31	29	93.55

Graph 3 : Accuracy of Mammography in Differentiating Benign and Malignant Lesions



(D) Ultrasonography:

Ultrasonography was done in 80 patients & the results were as follows:

TABLE 11

ULTRASONOGRAPHIC DIAGNOSIS

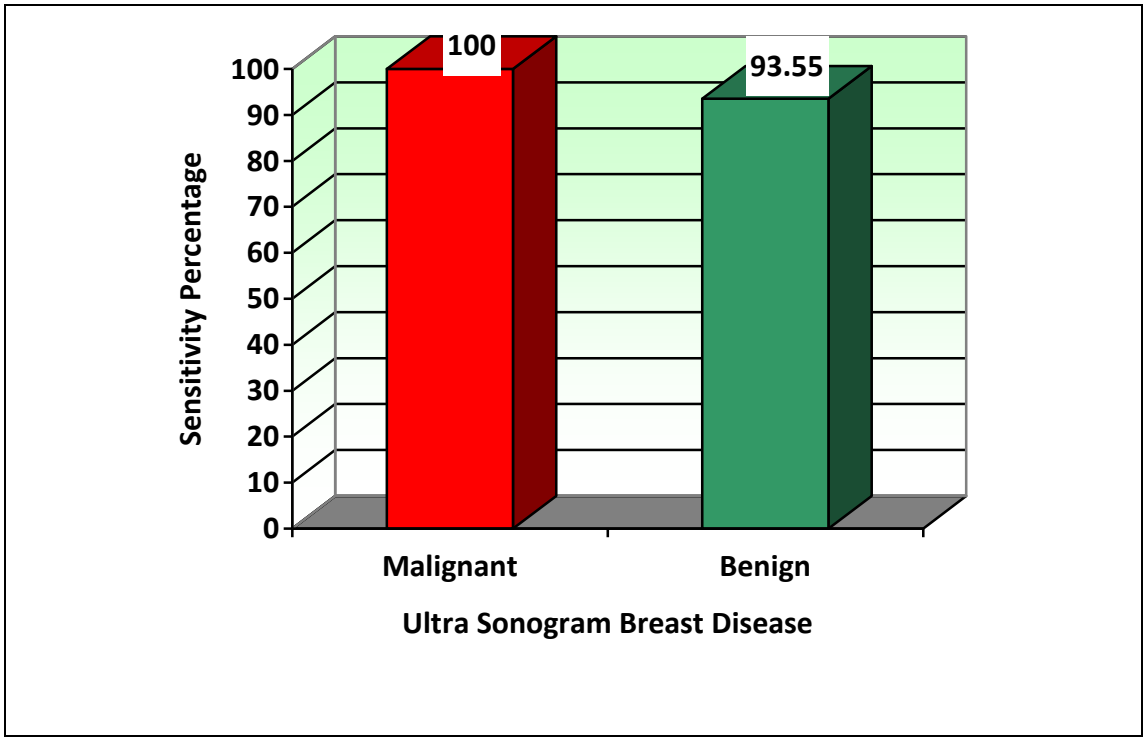
Ultrasonographic Diagnosis	No. of cases
Malignancy	49
Fibroadenoma	25
Phylloides tumor	2
Fibrocystic disease	2
Inconclusive	2

TABLE 12

ACCURACY OF ULTRASONOGRAPHY IN DIFFRENTITATION BENING AND MALIGNANT LESIONS

	No. of cases		
	Cytological diagnosis	Correctly diagnosed	%age
Malignant	49	49	100%
Benign	31	29	93.55%

Graph–4: Accuracy of Ultrasonography in Differentiating Benign and Malignant Lesions



Discussion

The rising trend of breast cancer in India, the large number of diagnostic modalities available for its diagnosis and the extensive work still going on throughout the world in this direction-all suggest the need to develop a diagnostic procedure which could solve the problem of differentiating benign and malignant breast lumps and of detecting breast cancer at an early stage.

The diagnostic methods that are most accepted today namely clinical examination, FNAC, Mammography and Ultrasonography are employed and accuracy of their results correlated.

Of the 80 cases included in the study, 31 were benign and 49 were malignant on cytological examination. Thus, majority of the cases in our study were malignant. Of the 31 benign cases,27 were fibroadenoma, 2 cystosarcoma phylloides & 2 fibrocystic diseases & in malignancy 42 were infiltrating ductal carcinoma & remaining 7 infiltrating lobular carcinoma.

On clinical examination, 27 out of the 29 patients of fibroadenoma were rightly diagnosed and they included 7 patients of juvenile fibroadenoma. All the 27 patients, diagnosed of fibroadenoma were below 30 years of age. This was in agreement with **Haagensen's**[3] study

in which the mean age of presentation of fibroadenoma was 31 years. According to **Bailey and Love[41],** fibroadenoma is the commonest tumor of the breast below 35 yrs. The 7 patients of juvenile fibroadenoma were between 13-19 yrs. and had a common presentation of a huge painless lump in the breast which was well defined and mobile. **Sabiston[80]** has also mentioned that juvenile fibroadenomas occur as large masses in adolescent women. In fact because of their age of presentation, they have been called by **Haagensen[3]** as "Massive adenofibromas in youth".

One case of fibroadenoma was misdiagnosed clinically as a case of malignancy of the breast. This 35 year old patient presented with a large painless lump of about 10 cm. in its maximum dimension with irregular margins, involving the outer half of the breast. The lump was slow growing and there was history of loss of appetite and weight. The lump was firm to hard in consistency. A provisional clinical diagnosis of carcinoma of left breast was made. Mammography of the lesion suggested it to be a fibroadenoma and lumpectomy was done. On HPE it was found to be a fibroadenoma with areas showing cystosarcoma phylloides like changes. This is just one of the examples of "limitations of clinical examination" in the words of **Haagensen.[3]** Such false positive diagnosis cause immense psychological trauma to the patient which can be averted by confirming the clinical diagnosis by further investigations before suggesting it to the patient.

A 45 year old patient who presented with a large mobile lump in her right breast was diagnosed clinically as cystosarcoma phylloides and this was supported by mammography. Wide local excision of the lump was done. But the same patient presented about three months later and was included in the study as a separate case. She was clinically diagnosed as a case of malignancy because of a short history in which the lump had recurred and gained an enormous size. The skin was red and ulcerated and there was a lump in the axilla. There was a definite history of anorexia and weight loss. Histopathology showed it to be cystosarcoma phylloides grade – 3.

It is interesting to note that this case of cystosarcoma phylloides had some features in common with the case discussed earlier which was diagnosed clinically to be malignancy and histologically turned out to be fibroadenoma with areas showing cystosarcoma like changes. Both the cases occurred in middle aged females (35-40 yrs), both had a huge lump without axillary lymphadenopathy as the initial presenting symptom and both had a history of anorexia and weight loss. Another case of juvenile fibroadenoma which presented in a 14 yrs. old female as a huge lump, histologically showed fibroadenoma wih cystosarcoma like changes.

Several conclusions about cystosarcoma phylloides can be made from comparison of the above cases:

(i) Cystosarcoma phylloides may mimic a fibroadenoma in its early stages.

(ii) Cystosarcoma phylloides like changes are not infrequent in fibroadenoma which suggest that cystosarcoma may result from abnormal proliferation of the stromal component in an already existing fibroadenoma.

(iii) Although it affects usually middle aged women, it may sometimes be present in young females when it cannot be distinguished clinically from juvenile fibroadenoma.

(iv) Systemic symptoms of anorexia and weight loss may occur in cystosarcoma phylloides and may add to the difficulty in distinguishing such lumps from malignancy.

(v) High-grade cystosarcoma phylloides has a tendency to recur.

Moreover **Haagensen**[3] has also described the occurrence of phylloides tumor in young patients — rarely; although the typical age of presentation, as in our study is the fifth decade.

Of the two other benign cases, two were of fibrocystic disease. The patient of fibrocystic disease was diagnosed clinically as duct ectasia because she had diffuse pain in both her breasts with a small lump in the upper and outer quadrant of the left breast near the areola; and she also

gave history of a turbid discharge from the nipple. In cases refractory to conservative treatment, excision of the lump was done and the FNAC revealed it to be fibrocystic disease.

49 cases were of carcinoma breast. A correct clinical diagnosis of carcinoma was made in 44 out of the 49 cases, 5 cases were misdiagnosed.

One case - a 35 years old female had a history of lump in her left breast in the infero-lateral quadrant for four months and turbid nipple discharge for three months. On examination, the lump was about 5 cm in diameter and was present close to the areola. There was no nipple discharge at the time of presentation. Diagnosis was difficult in this case and young age of the patient prompted to make a provisional clinical diagnosis of duct ectasia. Mammography of the patient was also not diagnostic. A descriptive report suggested a diagnosis of mastitis. FNAC of the lesion clearly showed it to be an infiltrating ductal carcinoma.

Another patient of carcinoma breast presented at 35 years of age with a single mobile lump of about 2 cms in diameter in the upper and inner quadrant of her right breast. She was misdiagnosed clinically as fibroadenoma until her mammography showed an infiltrating duct.

The above two cases again highlight the inadequacy of clinical examination in detecting a typical presentations of breast carcinoma. As is obvious such false negative clinical diagnosis are much more ominous that the false positive diagnoses. **Haagensen**[3] suggests that they can best be avoided by performing an FNAC or biopsy.

Thus two important features of our study need to be pointed out on the basis of clinical examination:

1. It was possible to correctly diagnose 94% of the benign and 90% of the malignant breast lesions. According to **Ackerman**[34] even the best clinician can diagnose breast cancer with an accuracy of 70%.
2. In our study all the patients with breast cancer were married, had children whom they had nursed. It seems that these factors do not have much contribution to the causation of breast cancer in our society. This is in contrast to the findings of **Khanolkar**[13] and **Paymaster**[81] in a comparative study on Parsi and Hindu women.

Clinical examination, as has been shown in our study and is also universally accepted, is indispensable and should always be done. Clinical diagnosis is highly accurate in our setup because

i. Majority of the breast cancers in our society, due to various reasons, present at a late stage.

ii. They are quite easily palpable and in a majority of cases the diagnosis can be made clinically.

FNAC : FNAC was done in all the patients of breast lumps in our study. FNAC showed the greatest accuracy (100%) as far as differentiation of benign and malignant cases was considered. It was able to diagnose all the 31 benign cases as benign and all the 49 cases of malignancy as malignant. However, a repeat FNAC was required in two cases of malignancy as in these, the material obtained on first aspirate was insufficient for diagnosis. An increase in the accuracy of the results by repeat FNAC has also been reported by **Wilkinson**[58].

Amongst the benign cases, all the 27 cases of fibroadenoma were rightly diagnosed by FNAC. However, as mentioned earlier, two cases of fibroadenoma on showed areas of cystosarcoma phylloides like changes which were not mentioned in the FNAC reports of these patients. There could be two reasons for this

1. The needle might not have struck the area having cystosarcoma like changes and so it was not detected.
2. If frank changes in terms of epithelial cells and stromal component are not present, differentiation between benign phylloides tumor and fibroadenoma may not be easy.

Shimizu et al[82] reviewed the cytological features of 25 cases of phylloides tumor and 50 cases of fibroadenoma and concluded that cytological differentiation between benign phylloides tumors and fibroadenomas is possible not only from the stromal hypercellularity but also from the size and shape of epithelial clusters.

In our study it was possible to diagnose a patient having cystosarcoma phylloides with grade III changes, on FNAC. This has also been suggested by **Hayshi et al**[83] who said that it is possible to distinguish between benign and malignant phylloides tumors on the basis of increased density of abnormal stromal components.

Two cases, fibrocystic disease were also subjected to FNAC. The case of fibrocystic disease was reported as duct ectasia. So an absolute diagnosis was not possible in these cases clinically. Thus in our study, the diagnostic accuracy of FNAC for benign lesions was 94%. **Furniwal et al**[84] have reported an accuracy of 96% and **Duguid**[86] has reported it to be 77%.

As far as a 100% accuracy for malignant cases is considered our results are comparable with the high accuracy rates reported for malignant lesions by different workers.

Furnival et al[84]	–	96%
Russ et a1[85]	–	94%
Duguid et al[86]	–	93.3%
Abete et al[65]	–	93.1%
Griffith et al[87]	–	98.7%

Moreover this result is not surprising when we consider the fact that all these carcinomas had either grade II or grade III changes (Majority being grade III in which the cytological features of malignancy (cellular and nuclear) are obvious. Two important reasons which may result in fall in accuracy of FNAC in diagnosing carcinoma are

i. Lesion is very small so that the needle did not hit the lesion.

ii. There is very minimal atypia of cell which may at times be difficult to interpret.

Both of these factors were not present in the present study group resulting in a high accuracy.

Mammography: Mammography is currently considered to be a very useful tool in diagnosing breast lesions but it has its own drawbacks. As pointed out by Bassett the mammographic findings of malignancy may be found in certain benign lesions as well accounting for the false positive results (diagnosing cancer when it is not actually present). Also

breast cancers, because of their versatility may mimic a benign lesion mammographically accounting for the false negative results (misdiagnosing a case of cancer as a benign lesion). The mammography was done in 80 patients in our study.

31 cases out of 80 in whom mammography was done were benign and 49 were malignant. Of the 49 malignant cases, 48 were diagnosed correctly by mammography on the basis of two distinguishing findings:

- A lesion of increased density with speculated margins and
- The presence of micro-calcifications present in clusters.

One patient of malignancy was wrongly diagnosed as a case of mastitis due to lack of the above characteristic findings.

Of the 31 benign cases, 25 were fibroadenoma, 2 cystosarcoma phylloides and 2 fibrocystic disease. 25 out of 27 cases of fibroadenoma were diagnosed correctly including five cases of juvenile fibroadenoma. The characteristic feature seen was a well defined opacity. 2 of these showed coarse scattered microcalcifications. Two case was reported as inconclusive because of lack of characteristic findings. In present study the accuracy of benign lesions & malignant lesions were diagnosed mammographically as 93.55% and 97.96% respectively.

ULTRASONOGRAPHY

Although It is better to image women having dense breast tissue with ultrasound which is superior to mammography, it is not used to screen breasts.

In our study ultrasonography was done in 80 patients of breast lumps. USG showed the greatest accuracy of 100% as far as differentiation of solid & cystic lesion was considered.

Amongst the benign cases ultrasonography was done in all 80 cases. 29 benign lumps were rightly diagnosed & two cases were inconclusive. Of the 49 malignant cases ultrasonography was done in all cases & which were also diagnosed correctly.

Conclusion

This retrospective study was done to determine the usefulness of clinical examination, FNAC, mammography & USG in evaluating breast lumps.

1. CLINICAL EXAMINATION

Remains the gold standard and should unequivocally be employed as the first line method for diagnosing breast lesions. In our study, out of 80 patients, 31 had benign lumps (27 fibroadenomas, 2 fibrocystic diseases, 2 cystosarcoma phylloides) and 49 had malignant lumps.

i. About 87.1% of the patients with benign lumps are within 30 years of age including 7 cases of juvenile fibroadenoma which are below 20 years of age. Majority (87.76%) of the patients with malignant lesions are between 30 and 60 years of age and there is a rise in incidence with advancing age, upto 50 years of age.

ii. Majority of the benign and the malignant cases are Hindus.

iii. All the patients with Carcinoma breast married and had children (1-5) whom they have breastfed. 29% are premenopausal and 71% are either perimenopausal or postmenopausal. None of the patients with Carcinoma breast have a positive family history.

iv. Pain is the second most common presenting symptom (36.25 %) in patients with breast lumps. It is more often associated with benign lumps. Nipple discharge is present in 17.5% of cases and is found in both benign and malignant cases. Flattening of nipple was found is one benign and 7 malignant lesions. Other symptoms of retraction of nipple, ulcer, skin edema, lump in axilla, systemic symptoms were associated with malignancy only. The duration of symptoms for benign lumps varied from 1 month to 4 years and the average duration of symptoms for malignant lumps was approximately 6 months.

v. 50% of the lesions are left sided, 41.25% right sided and 8.75% are bilateral. Bilaterality is seen with benign lumps only in our study. Upper half of the breast is more commonly affected, the distribution of lesions being more in the outer than inner quadrants.

vi. High grade cystosarcoma phylloides may present clinically as malignancy with axillary metastasis and in such cases clinical diagnosis of cystosarcoma phylloides is impossible.

vii. Clinical examination is found to have an accuracy of 93.35% in diagnosing benign lumps and of 89.80% in diagnosing malignant lumps.

2. FNAC

(I) FNAC has a diagnostic accuracy of 100% in differentiating benign and malignant lumps. However, it is found that the exact diagnosis amongst benign cases is possible in only 93.55% of cases. The accuracy for detecting malignancy is 100% and is found to increase with increased number of aspirations.

(II) Also, it is found that the diagnosis of cystosarcoma phylloides can be made on FNAC particularly if grade III changes are present but cystosarcoma like changes may be missed when present in association with fibroadenoma.

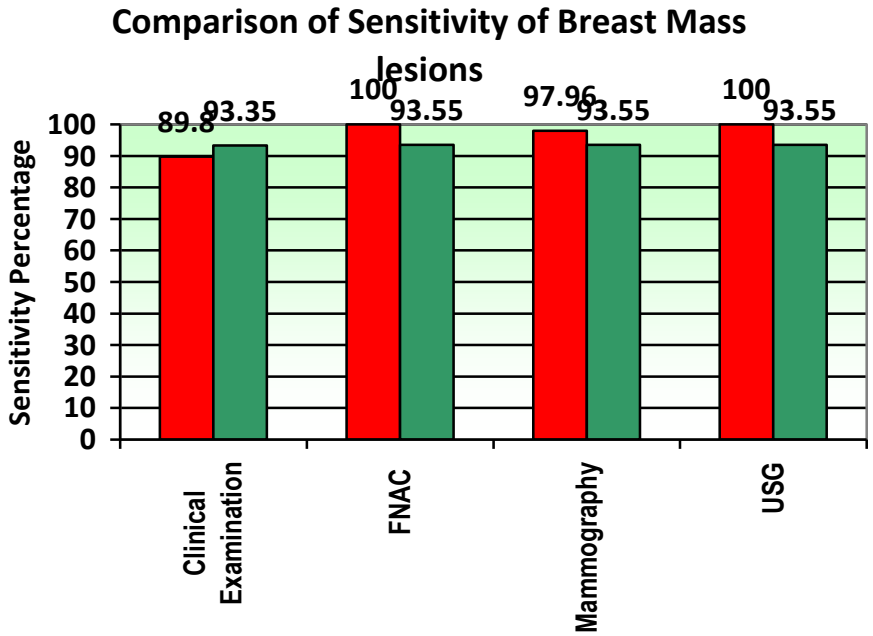
3. MAMMOGRAPHY

Mammography was done in 80 patients. It is able to detect 93.55% of the benign lumps and 97.96% of malignant lumps correctly.

4. ULTRASONOGRAPHY

Ultrasonography was done in 80 patients. The accuracy for both benign & malignant lump is 93.55% & 100% respectively.

Graph–5: Comparison of Sensitivity of Breast Mass lesions



After thorough study of each modalities clinical examination, FNAC, Mammography, Ultrasonography using 80 patients hospital record in retrospective manner, we concluded that for accurate diagnosis of breast mass lesions all CLINICAL EXAMINATION, FNAC, MAMMOGRAPHY AND ULTRASONOGRAPHY should be integrated in an orderly way by considering other factors like patients age, family history, size, duration of breast mass lesion etc and also physicians skill in all included techniques.

Summary

From the very ancient period carcinoma breast has been one of the most common ailments affecting human civilization. It is the most common carcinoma causing death in females in western world whereas it is second most common cause next to carcinoma cervix in developing world like India[1]. Though carcinoma breast seems easier to diagnose and treat but till today it is a challenge for medical professionals to restrain this malignant disease.

The use of the physical examination, mammography, and fine-needle aspiration biopsy for diagnosing palpable lumps is referred to as "triple diagnosis." There is excellent sensitivity (99%) and specificity (99%) with this approach.[2] If any of these three modalities suggests cancer, excisional biopsy is warranted.

A proper history and a thorough physical examination is the oldest and yet the most useful and indispensable method of diagnosis.

Several irreproachable advantages of FNA cytology in assessment of breast lumps have made it the first line modality in the investigative sequence. Some of these advantages are[4] : excellent patient compliance, short time required for planning of surgery and ancillary staging investigations without delay, avoidance of surgery in unequivocally benign conditions, equitable use of hospital and operation theatre

facilities with reduction in the need of frozen section, excisional or core needle biopsies.

Roentgenography to identify breast diseases was first used in 1913 at the University of Berlin. Since then, mammography has been widely accepted as a routine examination in the evaluation of breast diseases. Mammography is most widely used methods for detecting early breast cancer.

Mammography is a special type of x-ray, used to create detailed images of the breast. Mammography uses low dose x- ray : high contrast - high resolution film; and an x-ray system designed specifically for imaging the breasts.

Ultrasound is particularly useful in young women with dense breast in whom mammograms are difficult to interpret, and indistinguishing cysts from solid lesions. It can also be used to localize impalpable breast lumps.

Ultrasound can be used to evaluate abnormalities in breast seen in mammography. Both detected and undetected breast mass by other modalities can go for ultrasound guided biopsy. Biopsy is highly accurate ways to evaluate suspicious masses within the breast that are visible on ultrasound, whether or not they can be felt on breast self examination or clinical examination. Ultrasound guided biopsy is most useful when there are suspicious changes on the mammography that can also be seen on an

ultrasound examination, but no abnormality can be felt on breast self examination or clinical examination by your primary care physician.

The aims of the study are -

1. To evaluate the various diagnostic modalities in breast mass lesion by FNAC, USG, Mammography and Clinical assessment.
2. Utility and importance of integrated clinical, FNA Cytological, mammographical and Ultrasonographical approach in the diagnosis and work up of patients with breast mass lesion.

This is a retrospective study carried out in the department of general Surgery, Government Rajaji Hospital,Madurai medical college,Madurai,Tamil Nadu.Patients presenting in the surgery OPD between August 2010 to September 2012 with complaints of lump & other complaints in the breast who were admitted and subsequently operated were included in the study. The total number of cases studied were 80.

This retrospective study was done to determine the usefulness of clinical examination, FNAC, mammography & USG in evaluating breast lumps.

1. CLINICAL EXAMINATION

Remains the gold standard and should unequivocally be employed as the first line method for diagnosing breast lesions. In our study, out of 80 patients, 31 had benign lumps (27 fibroadenomas, 2 fibrocystic diseases, 2 cystosarcoma phylloides) and 49 had malignant lumps.

i) About 87.1% of the patients with benign lumps are within 30 years of age including 7 cases of juvenile fibroadenoma which are below 20 years of age. Majority (87.76%) of the patients with malignant lesions are between 30 and 60 years of age and there is a rise in incidence with advancing age, upto 50 years of age.

ii) Majority of the benign and all the malignant cases are Hindus.

iii) All the patients with CA breast married and had children (1-5) whom they have breastfed. 29% are premenopausal and 71% are either perimenopausal or postmenopausal. None of the patients with CA breast have a positive family history.

iv) Pain is the second most common presenting symptom (36.25 %) in patients with breast lumps. It is more often associated with benign lumps. Nipple discharge is present in 17.5 % of cases and is found in both benign and malignant cases. Flattening of nipple was found is one benign and 7 malignant lesions. Other symptoms of retraction of nipple, ulcer, skin edema, lump in axilla, systemic symptoms were associated with malignancy only.

The duration of symptoms for benign lumps varied from 1 month to 4 years and the average duration of symptoms for malignant lumps was approximately 6 months.

v) 50% of the lesions are left sided, 41.25% right sided and 8.75% are bilateral. Bilaterality is seen with benign lumps only in our study. Upper half of the breast is more commonly affected, the distribution of lesions being more in the outer than inner quadrants.

vi) High grade cystosarcoma phylloides may present clinically as malignancy with axillary metastasis and in such cases clinical diagnosis of cystosarcoma phylloides is impossible.

vii) Clinical examination is found to have an accuracy of 93.35% in diagnosing benign lumps and of 89.80% in diagnosing malignant lumps.

2. FNAC

(I) FNAC has a diagnostic accuracy of 100% in differentiating benign and malignant lumps. However, it is found that the exact diagnosis amongst benign cases is possible in only 93.55% of cases. The accuracy for detecting malignancy is 100% and is found to increase with increased number of aspirations.

(II) Also, it is found that the diagnosis of cystosarcoma phylloides can be made on FNAC particularly if grade III changes are present but cystosarcoma like changes may be missed when present in association with fibroadenoma.

3. MAMMOGRAPHY

Mammography was done in 80 patients. It was able to detect 93.55% of the benign lumps and 97.96% of malignant lumps correctly.

4. ULTRASONOGRAPHY

Ultrasonography was done in 80 patients. The accuracy for both benign & malignant lump was 93.55% & 100% respectively.

After thorough study of each modalities clinical examination,FNAC,Mammography,Ultrasonography using 80 patients hospital record in retrospective manner ,we concluded that for accurate diagnosis of breast mass lesions all CLINICAL EXAMINATION,FNAC ,MAMMOGRAPHY AND ULTRASONOGRAPHY should be integrated in an orderly way by considerin other factors like patients age,family history,size ,duration of breast mass lesion etc and also physicians skill in all included techniques.

ANNEXURES

BIBLIOGRAPHY

1. Vaidya MP Epidemiology of breast cancer in India. A text of breast cancer. Ed MP Vaidya & HS Shukla, Vikas Publishing house. Pvt. Ltd. Ghaziabad, UP (India) 1983; 1-7.
2. Layfield LJ, Glasgo Bj, Cramer H : Fine-needle aspiration in the management of breast masses. Pahtol Annu. 1989; 24 (pt 2): 23-62.
3. Haagensen CD : Diseases of the Breast 2nd end Philadelphia W.B. Saunders Co. 1971.
4. Orell SR, Lindhalm K : In manual & Atlas of fine Needle aspiration cytology. Breast, Churchill Livingstone, London. 1999, 146-149.
5. Mac Donald I: The breast. In Davis L. (Editor) Cristopher's text book of surgery. Ed. 7; Philadelphia, WB Saunders, Co 1960, P. 341-52.
6. WHO : Techn. Rep. Ser. No. 632, 1979.
7. WHO : The World Health Repot 1997, Report of the Director General WHO, 1997.
8. Landis SH et al Cancer statistics CA 48 : 6, 1998.
9. Robbins SL, Kumar V, Cotran RS : In Basic pathology 61 Ed. E.B. Saunders, Company 1997.
10. Mitra I. Desai PB: in "current Perspectives in breast Cancer" 3-10, Tata McGraw Hill publishing Company Limited, New Delhi, 1987.

11. Lippman ME : Breast Cancer in Harrison's Principles of Internal Medicine 14th Ed Vol. 1 pg. 562-63, 1998.
12. Lane-Claypon JE et al : A further Report on cancer of the Breast with special reference to the Associated Antecedent conditions. Ministry of Health Reports on Public Health and Medical subjects, No. 32 London, England, His Majesty's stationery Office, 1926.
13. Khanolkar VR and Paymaster : Breast cancer in Bombay. Internet. Union against cancer 17 : 903, 1961.
14. Willett WC, Stampfer MJ : Dietary fat and the risk of breast cancer. N Eng J med. 1987; p. 316-22.
15. JAMA : Alcohol consumption is associated with a linear increase in breast cancer incidence. Vol. 279; 1998; P. 535-55.
16. Kalacha A; McPherson K : oral contraceptives and breast cancer. Br. Hosp Med; 30: 278; 1987.
17. Lipnick R, Speizer FE: Case control study of risk indicators among women with premenopausal and early postmenopausal breast neoplasia in Bland KI, Copeland Em III : The Breast : Comprehensive management of benign and malignant disease. Philadelphia, WB Saunders, Chap. 13, 1991.
18. Vessey MP:Endogenous hormones in the etiology of cancer in women.JR Soc med;77:542;1984.

19. Lynch HT, Marcus JN et al: Familial breast cancer syndromes & predisposition to breast neoplasia in bland KI. Copeland EM III : The breast : Comprehensive management of benign & malignant diseases. Philadelphia, WB Saunders, Chap 13, 1991.
20. Lillienfeld AM : The epidemiology of breast cancer. Cancer Res. 23:1053, 1963.
21. Schoenberg BS: Multiple Primary Malignant Neoplasms: The Connecticut Experience, 1935-1964, New York, Springer- Verlag, 1977.
22. Schottenfeld D, Berg J: Epidemiology of multiple primary cancers. In Schottenfeld D (Ed.): Cancer Epidemiology and Prevention. Current concepts Springfield, III, Charles C Thomas, 1975.
23. Newell GR, Rawlings W, Krementz Et, et al: Multiple primary neoplasms in blacks compared to whites. Initial cancers of the female breast and uterus. J Nat Cancer Inst. 53 : 369; 1974.
24. Evans JS, WENNBERG JE The influence of diagnostic radiography on the incidence of breast cancer and leukemia. N Engl J Med; 315 : 810; 1986.
25. Horn PL, Thompson WD : Risk of contralateral breast cancer. Associations with histologic, clinical and therapeutic factor. Cancer; 62 ; 412; 1988.

26. Boica JD Jr, Blettner YM : Radiation dose and breast cancer risk in patients treated for cancer of cervix. Internet. J Cancer; 44 : 7; 1989.

27. Mohan N, Bal S: The epidemiology of Benign Breast Disease in India, Hospital Today Vol 11(8) : 15-19, July, 1997.

28. Shukla HS, Kumar S: Benign Breast Disorders in Nonwestern Populations: Part II — Benign Breast Disorders in India. World J Surg. 13: 746-749.

29. Khanna S, Arya NC, Khanna NN : Spectrum of Benign Breat Disease. Ind 3 Surg. 50 : 169-175, 1988.

30. Margolese R (ed): in Brest Cancer; Contemporary issues in clinical oncology vol. 1, Churchill Livingstone,1983

31. Dupont WD, Page DL : Risk factors for breast cancer in women with proliferative breast disease. N Engl. J Med. 312 : 146, 1985.

32. Hansen N, Morrow M : Breast Disease. Medical Clinics of North America 82 (2) : 203-22, breast disease. N Engl. J Med. 312 : 146, 1985.

33. Barton MB, Harris R, Fletcher SW. Does this patient have breast cancer? The screening clinical breast examination: should it be done? How? JAMA. 1999;282:1270-1280.

34. Ackerman LV, del Regato JA : in CANCER Diagnosis- Treatment-Prognosis 3rd Ed. The CV Mosby company, Saint Louis, 1962.

35. hPreece PE, baum M, Mansel RE et al : The importance of mastalgia in operable breast cancer. BMJ 248 :1299, 1982.
36. Fechner RE : Benign breast disease in women on estrogen therapy. Cancer 29 : 566, 1970.
37. Spratt JS, Donegam WL: in Cancer of the Breast; Vol V in the series 'Major Problems in clinical surgery' Philadelphia, WB Saunders Co. 1967.
38. Adair FE : Sanguineous discharge from the nipple and its significance in relation to cancer of the breast. Ann. Surg. 91 : 197, 1930.
39. Donnelly BA : Nipple discharge : Its clinical and pathologic significance. Ann Surg. 131
40. Copeland MM, Higgins TG : Significance of discharge from the nipple in non-purperal mammary conditions Ann. Surg. 15 : 638, 1960.
41. Bailey H, Love RM : in Bailey and Love's Short practice of Surgery, Revised by Mann CV, Russell RCG 25th Ed. ELBS, 2009.
42. Dent DM, Cant PF : Fibroadenoma. World J Surg. 13 706, 1989.
43. Suderland MC, McGuire WL: Prognostic Indicators in Invasive Breast Cancer. Surg. Clin. N. Am 70(5): 989- 1004, 1990.
44. Barth A, Craig PH, Silverstein MJ : Predictors of Axillary Lymph Node Metastases in Patients with T1 Breast Carcinoma, Cancer 79 : 1918-22, 1997.

45. Paget J : On disease of the mammary areola preceding cancer of the mammary gland. St. Barth. Hosp. Rep. 10 :86, 1874.

46. Crichlow RW, Gait SW : Male breast cancer. Surg. din North Am 70 : 1165-77, 1990.

47. Nagadowska MM, gentian IS: Male breast cancer. Journal of Applied Medicine, 505-508, July 1993.

48. Donegan WL, Redlich PN, Lang PJ, Gall MT : Carcinoma of the Breast in Males - Multiinstitutional Survey. Cancer 83:498-509, 1998.

49. Lee BJ, Tannebaum NE : Inflammatory carcinoma of the breast. Surg. Gynec & Obst. 39 : 580, 1924.

50. Kun M : A new instrument for the diagnosis of tumors. Monthly J Med Sci 1847; 7 : 853. Cited by Webb AJ. Through a glass darkly : the development of needle aspiration biopsy. Bristol Med Chir 3 89 : 59-68, 1974.

51. Menetrier P : Cancer primitif de poumon; Bull Soc Anat Paris 1886; 11 : 643, cited by Gunze H. Spriggs AT, History of clinical cytology : A selection of Documents Darmstadt : Ernst Gilbler, 1980.

52. Greig EDW, Gray ACH : Note on the lymphatic glands in sleeping sickness. Br med J I : 1252; 1921.

53. Guthrie CG : Gland puncture as a diagnostic measure. Bull Johns Hopkins Hosp. 32 : 266-9; 1921.

54. Dudgeon LS, Patrick CV : A new method for the rapid microscopical diagnosis of tumors. Br J Surg. 15 : 250- 61; 1927.

55. Martin HE, Ellis GB : Biopsy for needle puncture & aspiration Ann Surg 92 : 169-81; 1930.

56. Stewart F : Diagnosis of tumors by aspiration. Am J Pathol. 9 : 801-13, 1933.

57. Franzen S, Zajiceck J : Aspiration biopsy in diagnosis of palpable lesions of the breast : critical review of 3479 consecutive biopsies. Acta Radiol Ther (Stock) 7:241-62, 1968.

58. Wilkinson EJ, Bland KI : Techniques & results of aspiration cytology for diagnosis of benign & malignant disease of the breast, Surg Cl. N Am. 70(4): 801-813; 1990.

59. Young JA (ed) : Fine needle aspiration cytopathology Blackwell scientific publications, 1993.

60. Vorkerr H : Breast aspiration biopsy with multiple needle for histologic & cytologic examination. Am J Obstet gynecol. 151 : 70-6; 1985.

61. Holmquist ND : Fine needle aspiration by vaccum tube Am J Clin pathol 92 : 96-8; 1989.

62. Zaldela A, Zillhardt P, Voillemot N : Cytological diagnosis by fine needle sampling without aspiration cancer. 59 : 1201-5; 1987.

63. Ansari NA, Derias NW : Origins of fine needle aspiration cytology. J Clin Path 50 : 511-13, 1997.

64. Hajdu SI Melamed MR : Limitations of aspiration cytology in the diagnosis of primary neoplasms. Acta cytol. 2 8; 337-45; 1984.

65. Abele JS, Miller TR, Goodson WH III, et al Fine needle aspiration of palpable breast masses: A program for staged implementation. Arch. Surg. 118 : 859-863, 1983.

66. Salomon A: Beitrage Zur-Pathologie Und Klinik deMammakarzinome — Arch Klin Chir 101: 573, 1913.

67. Warren SL: A roentgenologic study of the breast Am J Roentgenol Rad Ther 24: 113, 1930.

68. Leborgne R : Diagnosis of tumors of the breast by simple roentgenography : Calcifications in carcionomas. Am J Roentgenol Rad Ther 65 : 1, 1951.

69. Egan RL : Experience with mammographyin a tumor institution : Evaluation of 1000 studies. Radiology 75 :894, 1960.

70. Gros. CM : Methodologie : Symposium sur le sein J Radiol Electrol Med. Nucleaire 48 : 638, 1967.

71. Weiss JP, Wayrynen RE: Imaging system for low dose mammography J appl Photograph Eng 2:7, 1976.

72. Lundgren B : The oblique view at mammography Br J Raiol 50: 626, 1977.

73. Strax P et al: Mammography and clinical examination in mass screening. Cancer 20: 2184, 1967.

74. Bassett LW, Manjikian V, Gold RH : Mammography and Breast Cancer screening Surg clin N Am 70(4) : 775-800, 1990.

75. Tabar L, Dean PB: Teaching Atlas of Mammography New York, Thiene — Stratton, 1983.

76. Sickles EA: Mammographic features of 300 consecutive nonpalpable breast cancers. AJR 146: 661, 1986.

77. Hardesty LA, Klym AH, Shindel BE, Chough DM, Sumkin JH, GurD: Is maximum positive predictive value a good indicator of an optimal screening mammography practice? AJR Am J Roentgeno!. 2005 ; 184 (5) : 1505-7.

78. Lee KW, Chung SY, Yang I, Kim HD, Shin SJ, Kim JE, Chung BW, Choi JA : Inflammatory breast cancer: imaging findings. Clin Imaging. 2005 ; 29 (1) : 22-5.

79. Wild JI, Reid JM : Further pilot echographic studies on the histologic structure of tumors of the living intact human breast. AM J Pathol.28 : 839; 1952.

80. Sabiston DC Jr., Lyerly HK In Textbook of surgery - The Biological basis of Modern surgical practice 15th Ed. WB Saunders Company, 1997.

81. Paymaster JC, Gangadharm T : Cancer in the Parsi Community in Bombay, Internet J. Cancer, 5:426, 1970.

82. Shimizu K, Korematsu M, Masawa N, Yamada T, Tsuchiya S : Phylloides tumors of the breast : cytologic evaluation in FNAB (Ab) Acta cytologica 42 (2) : 568; 2006

83. Hayashi T, Imaizumi T, Nishimura T, Kishikawa M, Kojima H, et al : A Review of Breast ABC conduct over the past five years, with special reference to Phylloides Tumor (Ab) Acta Cytologica 42(2) : 484, 1998.

84. Furnival CM, Hughes HE, Hocking MA, Reid MMW, Blumg art MMW : Aspiration cytlogy in breast cancer. Its relevance to diagnosis. Lancet Sept. 6; 446-49; 1985.

85. Russ J, Winchester D : Cytologic findings of aspiration of tumors of breast. Surg. Gynae Obstet 146 : 407-411, 1978.

86. Duguid HLD, Wood RAB, Irving AD, Preece PE, Cuschiere A Needle aspiration of breast with immediate reporting of material. Br Med J 11: 185-87; 1929.

87. Griffith C Kern W, Mikkelson W : Needle aspiration cytological examination in management of suspicious lesions of the breast. Surg Gynae Obstet. 162 ; 142-144; 1986.

88. Limitations of Fine Needle Aspiration Cytology in Subtyping Breast Malignancies - A Report of Three cases-Joshi A, Maimoon S-Journal of Cytology 2007; 24 (4) : 203-206

89. Yoney A, Kucuk A, Unsal M.- Male breast cancer: a retrospective analysis. Cancer Radiother 2009; 13: 103-107.

90. Ottini L, Palli D, Rizzo S, Federico M, Bazan V, Russo A. Male breast cancer. Crit Rev Oncol Hematol 2009 May 7.

91. Wynne E, Louie A. Epidermoid cyst of the breast; Mammography, ultrasound, MRI. Radiology Case Reports. [Online] 2011;6:431

92. http://icmr.nic.in/cancer.pdf/2010

PROFORMA

Name : Age & Sex :

IP No. : Unit :

Occupation :

Address :

Date of Admission : Date of discharge :

Age at menarche : Age of menopause :

Menstrual history : Regular / Irregular

Length of cycle

LMP

Marital status : Parity :

Breast feeding Details :

Whether each child was breast fed or not

If breast fed for how long ?

Drug History : HRT / OCP

Family History :

Clinical findings :

Investigations :

Mammography report :

FNAC report or Ultrasound report :

MASTER CHART

Sl. No.	Name	Age/ Sex	DOA	IPNO	Diagnosis	Clin.Exm	FNAC	Mamo	USG
1.	MURUGESHWARI	35/F	27-08-2010	62549	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
2.	MEENA	70/F	27-08-2010	62079	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
3.	THANGAMMAL	38/F	31-08-2010	62616	CYSTOSARCOMA PHYLLOIDES RT	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
4.	UNNAMALAI	70/F	31-08-2010	62529	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
5.	MURUGESHWARI	35/F	17-09-2010	64504	CARCINOMA RIGHT BREAST	INCONCLUSIVE	CONFIRMED	INCONCLUSIVE	CONFIRMED
6.	VALLIAMMAL	59/F	17-09-2010	64583	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
7.	BANU	14/F	17-09-2010	81161	FIBROADENOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
8.	MEERA	13/F	24-09-2010	64826	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
9.	RAJESHWARI	21/F	24-09-2010	65101	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
10.	STELLA	38/F	13-10-2010	82142	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
11.	KALAVATHY	60/F	13-10-2010	66234	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
12.	LAKSHMI	68/F	15-10-2010	66458	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
13.	ABIRAMI	22/F	15-10-2010	67144	FIBROADENOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
14.	AMUTHA	19/F	22-10-2010	68224	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
15.	ESWARI	40/F	22-10-2010	92270	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
16.	KARTHIKADEVI	16/F	22-10-2010	208860	FIBROADENOMA RIGHT BREAST	INCONCLUSIVE	CONFIRMED	INCONCLUSIVE	INCONCLUSIVE
17.	SHANTHI	59/F	11-11-2010	210134	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
18.	PATCHAIYAMMAL	59/F	22-11-2010	231120	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
19.	KALYANI	69/F	26-11-2010	235333	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
20.	KALA	50/f	26-11-2010	238642	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED

Sl. No.	Name	Age/ Sex	DOA	IPNO	Diagnosis	Clin.Exm	FNAC	Mamo	USG
21.	PALANIYAMMAL	35/F	13-12-2010	234223	B/L FIBROADENOMA	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
22.	AARAYAMMAL	59/F	27-12-2010	61919	CARCINOMA LEFT BREAST	INCONCLUSIVE	CONFIRMED	CONFIRMED	CONFIRMED
23.	SALEEMA	44/F	31-12-2010	213646	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
24.	THIRUMAGHAL	58/F	14-03-2010	233361	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
25.	SUNDARAVALLI	42/F	14-03-2011	241113	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
26.	MEENAKSHI	17/F	21-03-2011	78979	B/L FIBROADENOMA	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
27.	NAJEEMA	45/F	21-03-2011	73447	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
28.	MUNIYAMMAL	60/F	14-05-2011	80088	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
29.	KUMARI	45/F	14-05-2011	81201	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
30.	GANDHIMATHY	23/F	23-05-2011	11064	FIBROCYSTIC DISEASE	INCONCLUSIVE	CONFIRMED	CONFIRMED	CONFIRMED
31.	UMADEVI	46/F	06-06-2011	14169	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
32.	PANCHAVARNAM	38/F	06-06-2011	14821	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
33.	KAMATCHI	47/F	O6-08-2011	15010	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
34.	SHANTHI	48/F	16-08-2011	11386	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
35.	MEGHALA	24/F	20-08-2011	11742	FIBROADENOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
36.	SHANTHI	42/F	20-08-2011	11919	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
37.	LOGESWARI	18/F	20-08-2011	12141	B/L FIBROADENOMA	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
38.	SULTHANA	39/F	19-09-2011	12350	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
39.	RAJESHWARI	46/F	19-09-2011	12398	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
40.	NEELA	48/F	26-09-2011	13330	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED

Sl. No.	Name	Age/ Sex	DOA	IPNO	Diagnosis	Clin.Exm	FNAC	Mamo	USG
41.	SUREKHA	35/F	26-09-2011	14321	FIBROADENOMA RIGHT BREAST	INCONCLUSIVE	CONFIRMED	INCONCLUSIVE	INCONCLUSIVE
42.	LAKSHMI	25/F	26-09-2011	15111	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
43.	SHAKILA BANU	50/F	14-10-2011	15979	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
44.	SIVANAMMAL	39/F	14-10-2011	16212	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
45.	SUNDARI	50/F	21-10-2011	17773	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
46.	LAVANYA	15/F	21-10-2011	17780	FIBROADENOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
47.	INDHU	26/F	28-10-2011	18432	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
48.	MUMTAJ	50/F	28-10-2011	19001	CARCINOMA RIGHT BREAST	INCONCLUSIVE	CONFIRMED	CONFIRMED	CONFIRMED
49.	REKHA	27/F	28-10-2011	20005	B/L FIBROADENOMA	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
50.	JOOHRA	48/F	11-11-2011	20100	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
51.	SUGANTHY	19/F	18-11-2011	20287	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
52.	SUNDHRAMBAL	46/F	18-11-2011	20312	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
53.	KAVITHA	60/F	18-11-2011	20363	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
54.	SWETHA	28/F	23-12-2011	20412	B/L FIBROADENOMA	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
55.	MOWNICA	29/F	23-12-2011	20443	FIBROADENOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
56.	SWATHI	24/F	23-12-2011	20497	FIBROCYSTIC DISEASE RIGHT BREAST	INCONCLUSIVE	CONFIRMED	CONFIRMED	CONFIRMED
57.	RADHIKA	35/F	13-01-2012	21521	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
58.	ANANDHI	29/F	13-01-2012	22213	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
59.	JYOTHI	39/F	20-01-2012	22311	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
60.	SUGANYA	45/F	23-01-2012	23333	CYSTOSARCOMA PHYLLOIDES RT	INCONCLUSIVE	CONFIRMED	CONFIRMED	CONFIRMED

Sl. No.	Name	Age/ Sex	DOA	IPNO	Diagnosis	Clin.Exm	FNAC	Mamo	USG
61.	SENTHAMARAI	51/F	23-01-2012	24800	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
62.	SELVI	42/F	27-02-2012	24823	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
63.	GOMATHY	30/F	27-02-2012	24901	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
64.	RAMYA	19/F	27-02-2012	25123	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
65.	SHARMILA	38/F	16-03-2012	26764	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
66.	NAVEENA	52/F	18-03-2012	26241	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
67.	ABINAYA	24/F	25-03-2012	26661	B/L FIBROADENOMA	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
68.	PRIYA	43/F	25-03-2012	26909	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
69.	SUBHASINI	70/F	15-04-2012	27132	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
70.	GAYATHRI	25/F	29-04-2012	27823	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
71.	INDHUMATHY	44/F	29-04-2012	27993	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
72.	FATHIMA	40/F	13-05-2012	28883	CARCINOMA RIGHT BREAST	INCONCLUSIVE	CONFIRMED	CONFIRMED	CONFIRMED
73.	DHANALAKSHMI	26/F	13-05-2012	29001	FIBROADENOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
74.	VENNILA	40/F	24-06-2012	30005	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
75.	YOGESHWARI	27/F	24-06-2012	30152	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
76.	MEENAKSHI	70/F	29-07-2012	30332	CARCINOMA RIGHT BREAST	INCONCLUSIVE	CONFIRMED	CONFIRMED	CONFIRMED
77.	KALIYAMMAL	40/F	29-07-2012	30531	CARCINOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
78.	JEYAM	25/F	21-08-2012	30785	B/L FIBROADENOMA	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
79.	THENMOZHI	14/F	21-08-2012	32211	FIBROADENOMA LEFT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED
80.	THERASA MARY	38/F	18-09-2012	33369	CARCINOMA RIGHT BREAST	CONFIRMED	CONFIRMED	CONFIRMED	CONFIRMED

Ref. No. 3104/E4/3/2012

Govt.Rajaji Hospital,Madurai.20.
Dated: .03.2012

Institutional Review Board / Independent Ethics Committee.

Dr. A. Edwin Joe, M.D (FM), BL.,
Dean, Madurai Medical College & 2521021 (Secy)
Govt Rajaji Hospital, Madurai 625020.
Convenor
grhethicssecy @gmail.com.

Sub: Establishment-Govt. Rajaji Hospital, aMadurai-20-
Ethics committee-Meeting Agenda-communicated-regarding.

The Ethics Committee meeting of the Govt. Rajaji Hospital, Madurai was held at 11.00 Am to 1.00Pm on 29.03.2012 at the Dean Chamber, Govt. Rajaji Hospital, Madurai. The following members of the committee have been attended the meeting.

1. Dr.N.Vijayasankaran,M.ch(Uro.) 094-430-58793 0452-2584397	Sr.Consultant Urologist Madurai Kidney Centre, Sivagangai Road,Madurai	Chairman
2. Dr.P.K. Muthu Kumarasamy, M.D., 9843050911	Professor & H.O.D of Medical, Oncology(Retired)	Member Secretary
3. Dr.T.Meena,MD 094-437-74875	Professor of Physiology, Madurai Medical College	Member
4. Dr. S. Thamilarasi, M.D (Pharmacol)	Professor of pharmacology	
5. Dr.Moses K.Daniel MD(Gen.Medicine) 098-421-56066	Professor of Medicine Madurai Medical College	Member
6. Dr.M.Gobinath,MS(Gen.Surgery)	Professor of Surgery Madurai Medical College	Member
7. Dr.S. Dilshadh, MD(O&G) 9894053516	Professor of OP&Gyn Madurai Medical College	Member
8. Dr.S.Vadivel Murugan., M.D, 097-871-50040	Professor of Medicine Madurai Medical College	Member
9. Shri.M.Sridher,B.sc.B.L. 099-949-07400	Advocate, 2, Deputy collectors colony 4th street KK Nagar, Madurai-20.	Member
10. Shri.O.B.D.Bharat,B.sc., 094-437-14162	Businessman Plot No.588, K.K.Nagar,Madurai.20.	Member
11.Shri. S.sivakumar,M.A(Social) Mphil 093-444-84990	Sociologist, Plot No.51 F.F, K.K Nagar, Madurai.	Member

Following Projects were approved by the committee

Sl. No	Name of P.G.	Course	Name of the Project	Remarks
1.	Mohan,	PG, M.S (gen surg)	Clinical study of breast masses, including mammography, FNAC and ultrasound	Approved

Please note that the investigator should adhere the following: She/He should get a detailed informed consent from the patients/participants and maintain Confidentially.

1. She/He should carry out the work without detrimental to regular activities as well as without extra expenditure to the institution to Government.
2. She/He should inform the institution Ethical Committee in case of any change of study procedure site and investigation or guide.
3. She/He should not deviate for the area of the work for which applied for Ethical clearance. She/He should inform the IEC immediately, in case of any adverse events pr Serious adverse reactions.
4. She/he should abide to the rules and regulations of the institution.
5. She/He should complete the work within the specific period and apply for if any Extension of time is required She should apply for permission again and do the work.
6. She/He should submit the summary of the work to the Ethical Committee on Completion of the work.
7. She/He should not claim any funds from the institution while doing the word or on completion.
8. She/He should understand that the members of IEC have the right to monitor the work with prior intimation.

DEAN

To
All the above members and Head of the Departments concerned.
All the Applicants.

Professor and Head
Department of Surgery
MADURAI MEDICAL COLLEGE
Govt. Rajaji Hospital
Madurai-20

1) Juvenile Fibroadenoma

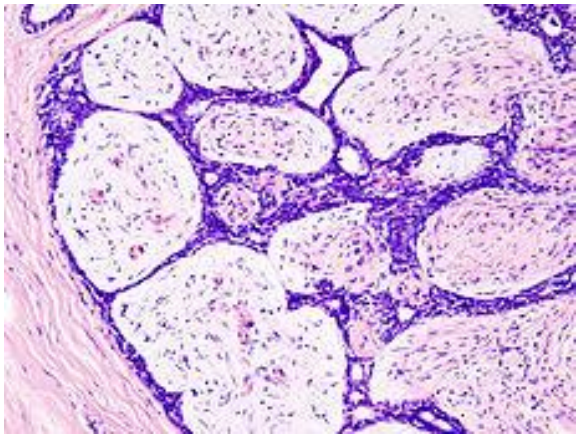
2) Carcinoma Breast-Nipple Retraction

3) Carcinoma Breast-peaud orange appearance

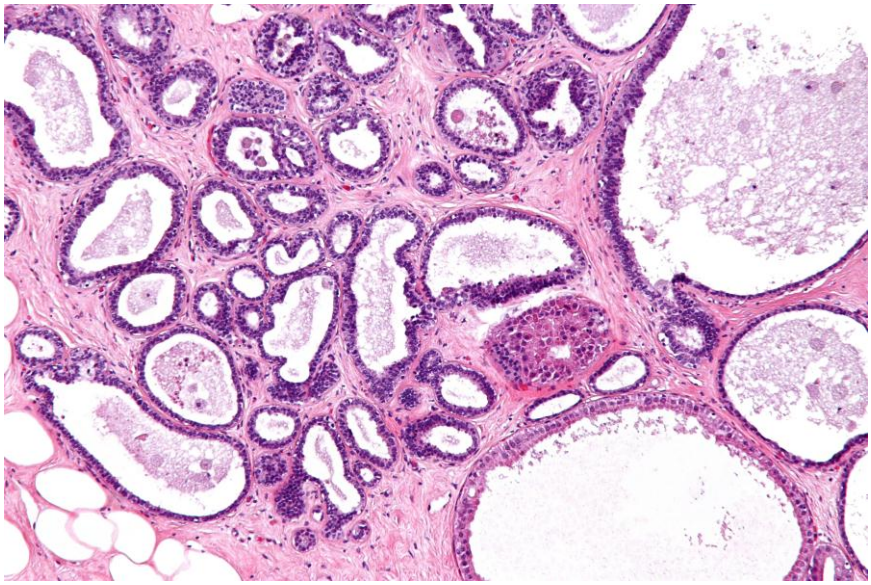
4) Carcinoma Breast –Ulcer

5) Male Breast Cancer

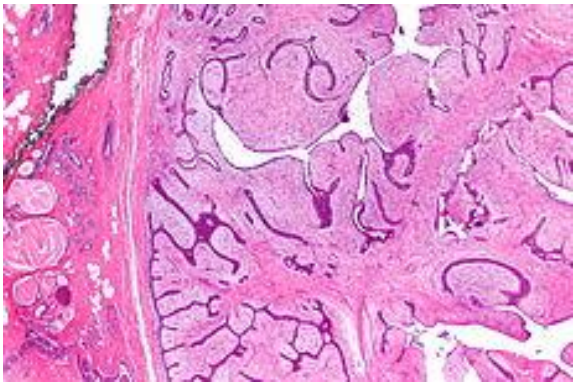
6) Fibroadenoma of Breast



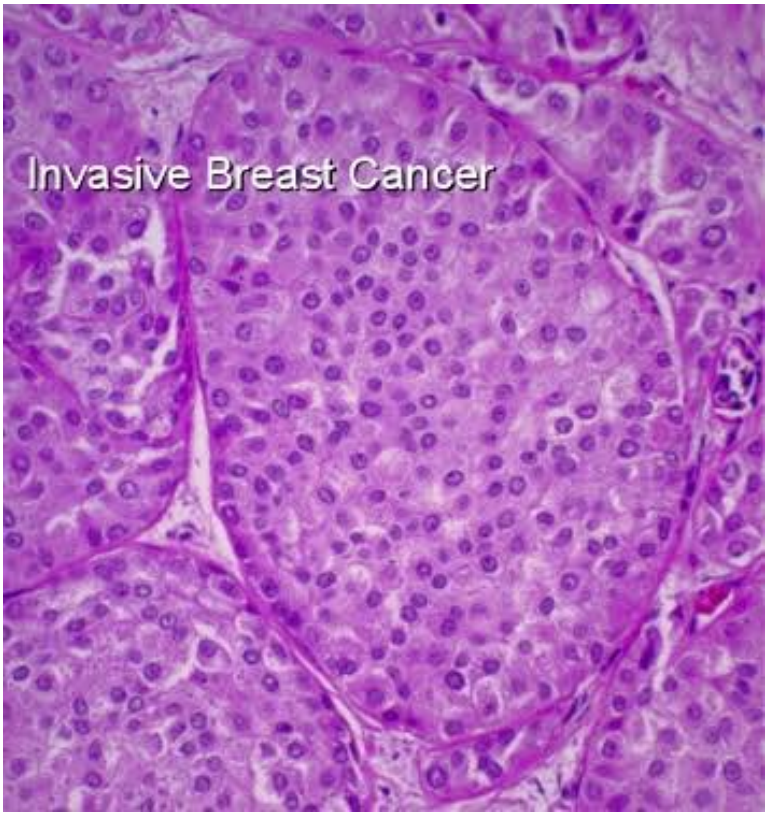
7) Fibrocystic Disease



8) Cystosarcoma phyllodes - Long clefts and myxoid cellular stroma



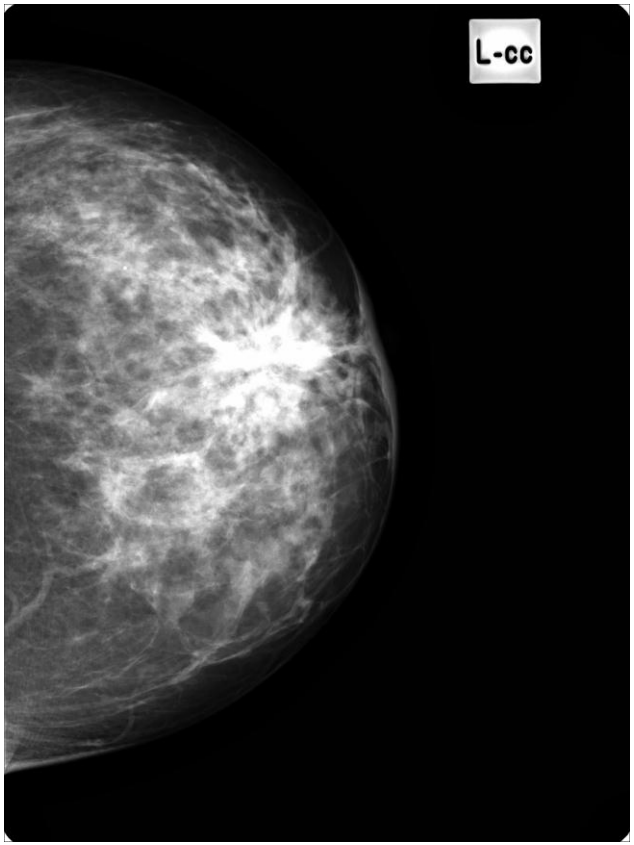
9)Ggrade-III-Breast-Cancer-Cells



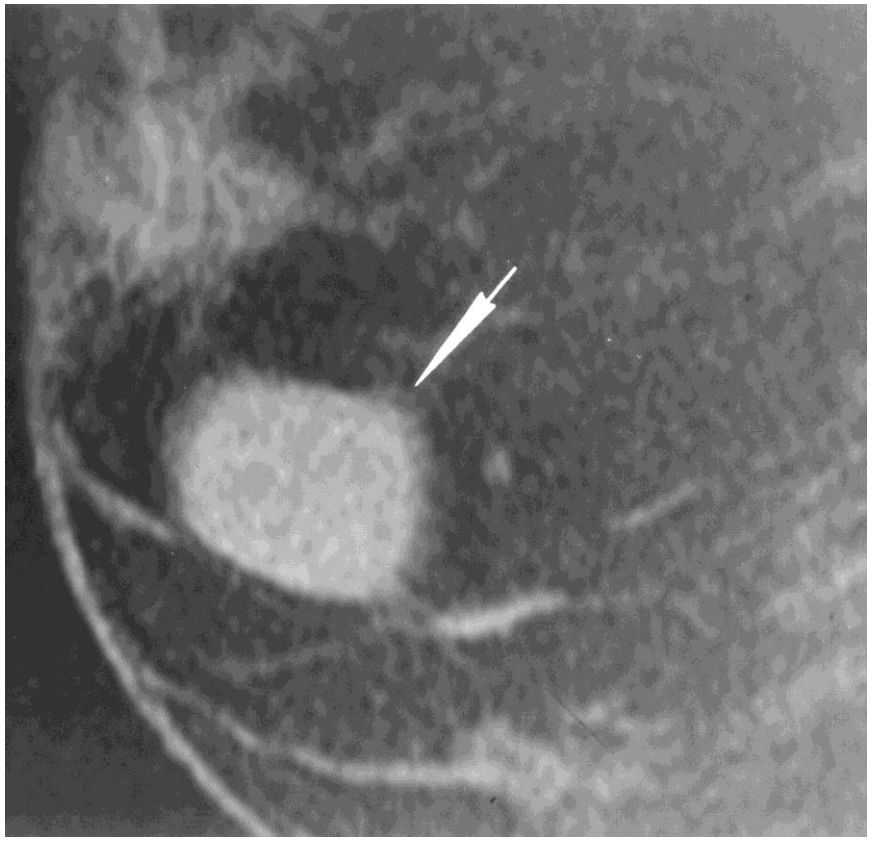
10) FNAC-Breast Mass

11) Mammography machine	***12) Mammography machine***
	

13) Mamography, Radiodense opacity with speculated margins MALIGNANT BREAST



14) Mammography, Homogenous opacity-mediolateral view, BENIGN BREAST DISEASE

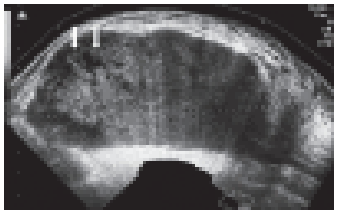


15)Ultrasound machine

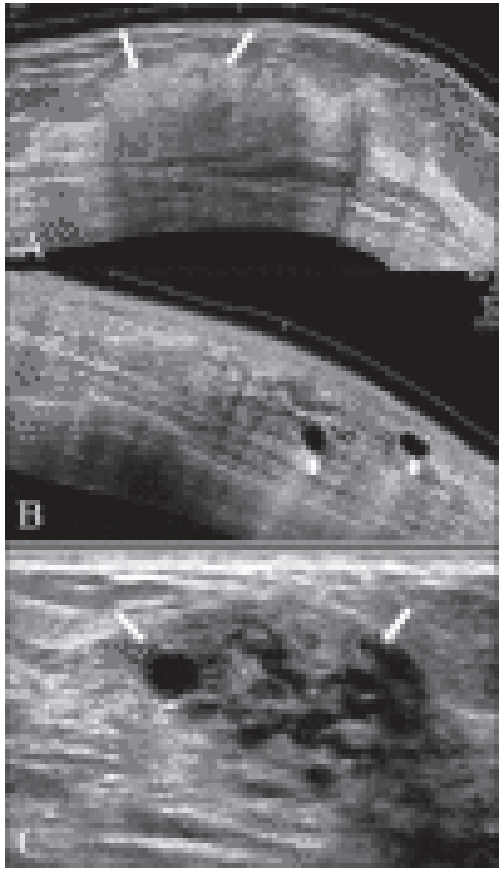
16) Normal breasts

17) USG- Fibroadenoma

18) USG- Cystosarcoma Phyllodes



19) Fibrocystic disease



20)USG malignant Breast